TECHNOLOGY DEPT.

The Chemical Age

A Weekly Journal Devoted to Industrial and Engineering Chemistry

VOL. XLVII
No. 1222

SATURDAY, NOVEMBER 28, 1942
REGISTERED AS A NEWSPAPER

6D. PER COPY
POST FREE 8D.

PUBLIC LIBRARY
DEC 1 1942
DETROIT

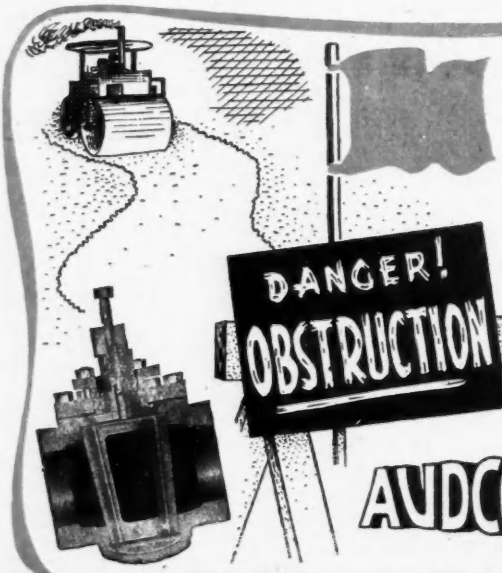
1. *The Multelec-Controller for temperature, pH and electrolytic conductivity.*
2. *Typical instrument panel.*
3. *Ring-type Air or Gas Flow Recorder.*
4. *'KM' Flow Meter for all fluids.*
5. *Curved Tube Manometer for air or gas.*
6. *RS/C Shunt Meter for Steam or Air.*
7. *'M' type Water Meter, (size ½ in. to 3 in.)*
8. *Oil Meter.*
9. *Automatic boiler control (hydraulic master controller.)*
10. *'Uniform' Cold-water Meter, (sizes 2in. to 6in.)*

Kent metering equipment, with its sound basic design and fine workmanship, is extremely robust and stands up well to every-day industrial conditions, without loss of accuracy.

Kent instruments are being used to an ever-increasing extent in the chemical and industrial world.

GEORGE KENT

GEORGE KENT LTD., LUTON & LONDON



The "obstruction" in a stuck valve constitutes a real danger when immediate release of liquids under temperature pressure or vacuum is required.

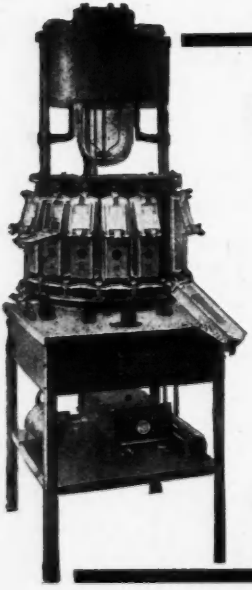
The Lubriseald Principle embodied in Audco Valve design, ensures three vital features :—

NO STICKING.
NO LEAKAGE.
AND MINIMISES CORROSION

For these reasons, AUDCO has proved itself the ONLY valve of its kind for Chemical Services.

AUDCO VALVES

AUDLEY ENGINEERING COMPANY LIMITED · NEWPORT · SHROPSHIRE · England



The

K.B.B. FUGITOMETER

for rapidly testing the fading characteristics of paints and the durability of varnishes, etc.

The K.B.B. Fugitometer is a complete unit, with electric lamp, air circulating system, motor control switches, and steadying resistance

BRITISH MADE BY

KELVIN, BOTTOMLEY & BAIRD LTD.

GLASGOW

S

DORRCO

DORR-OLIVER EQUIPMENT

FOR WAR-TIME PROBLEMS
in Industrial processes

FILTERS
AGITATORS
THICKENERS
CLASSIFIERS
CLARIFLOCCULATORS
SAND WASHERS
TURBO MIXERS
PUMPS, ETC.

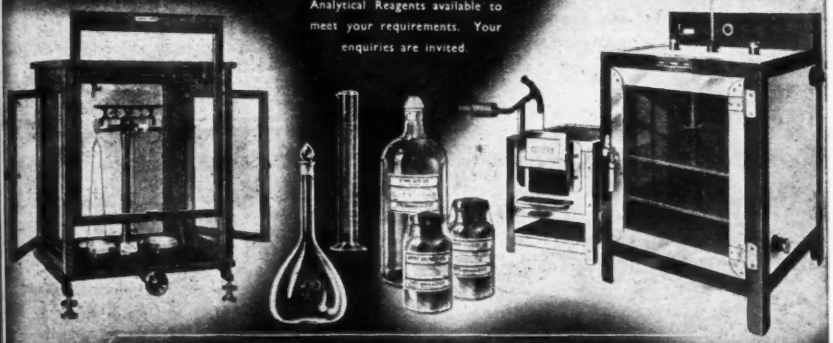
● We have gained **KNOWLEDGE** and **EXPERIENCE** of chemical plants throughout the world in times of peace which is available to you in developing your treatment processes of essential materials needed in the war effort.

CAN WE HELP **YOU?**

DORR-OLIVER CO. LTD. ABFORD HOUSE, WILTON RD. LONDON, S.W.1.

TOWERS LABORATORY APPARATUS

There is a wide range of Towers Laboratory Apparatus and Towers Analytical Reagents available to meet your requirements. Your enquiries are invited.



J. W. TOWERS & CO. LTD.
SCIENTIFIC APPARATUS AND PURE CHEMICAL MANUFACTURERS

MANCHESTER
44, Chapel St., Salford, 3

Head Office
WIDNES
LANCASHIRE

LIVERPOOL
134, Brownlow Hill

INDUSTRIAL USERS MUST SAVE COAL!

And we can! True, not every boiler can work at the high thermal efficiency of a super power station! But every little helps—and users big and small can save an enormous aggregate tonnage of coal by applying some of the principles used in these giant steam generating plants. ● A lifetime's systematic study of boiler plant used for raising power and process steam in works throughout the country has shown that the point at which the heat passes from the boiler tubes and shell to the water is vitally important. Large losses at this stage can be prevented only by **specific** water treatment. The difference in the coal saved by just **some** water treatment and by the **correct** treatment (taking into account all your special circumstances) is great. It becomes greater when, as is now so often the case, boilers must be steamed beyond their normal capacity. ● We therefore urge every steam user to ask himself one question—"Can I honestly say that I **know** my boiler water is to-day right for minimum fuel consumption?" Only when the answer is "Yes" are we making our proper individual contribution to the saving of man-hours in the mines and on the railways now so urgently necessary.

TALK IT OVER WITH SOFNOL

Telephone: Greenwich 1600

Issued to help save fuel by SOFNOL LTD., GREENWICH, S.E.10.

TAS/SL. 106

THOSE KEGS CAN SAVE STEEL

In many instances wooden containers can replace those of steel—which is vitally needed for munitions

The construction of "GUELPH" casks shews an economy in timber, as proved to the satisfaction of the authorities. Nevertheless that same construction provides great strength and utility.

Where work of national importance is concerned we are always "interested," for the use of "GUELPH" casks is to the national interest.

THE GUELPH CASK VENEER & PLYWOOD CO. LTD.
West Ferry Rd., Millwall, London, E.14. *Phone: East* 1489
Also at Manchester, England; Scotstown, Quebec; and Mattawa, Ontario Canada

HYDROGEN PEROXIDE
Concentrated Qualities. Dyestuffs & Chemicals
COLE & WILSON, LTD.
24, Greenhead Road, HUDDERSFIELD
Phone: Huddersfield 1993. *Grams: 'Colour' Huddersfield*

The fact that goods made of raw materials in short supply owing to war conditions are advertised in this paper should not be taken as an indication that they are necessarily available for export.

For service and satisfaction

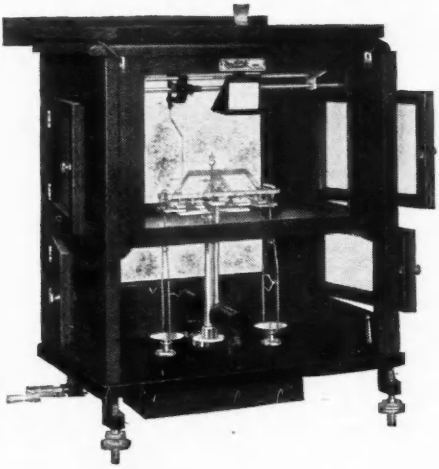
Let us quote for COMPLETE TAR PLANTS; NEW STILLS OR REPAIRS; RIVETED OR WELDED, Benzol Stills, Tanks, Jacketed Pans and all types of

STEEL PLATE WORK

for chemical processes.

LEEDS & BRADFORD BOILER CO., LTD.
STANNINGLEY, near LEEDS

Reliable MICRO-CHEMICAL BALANCES



BRITISH PRECISION BALANCES & WEIGHTS

We were pioneers in the design and manufacture of British balances for the now exceedingly important micro-analytical technique. Even before the war, our micro and semi-micro balances were preferred by leading micro chemists, whose co-operation has been extremely valuable in perfecting a design at once quick and easy to read, sturdy and reliable. As a result Britain can now claim a leading place in the design of micro balances—a position we hope, by our vigorous development policy, to maintain.

Please request specification No. 63 P.B.

L. OERTLING LTD.
Ellerdale Road., LONDON, N.W.3.

Oertling
FOUNDED IN LONDON BEFORE 1847

TAS./OR.208

SAL-FERRICITE

FOR

WATERPROOFING WATERTANKS AND RESERVOIRS

Sal-Ferricite Liquid has the effect of reducing the setting and hardening time of mass concrete, cement mixes, slurries, etc., and it is possible to fix the setting and hardening time down to any period desired. . . . . .

*

SAL-FERRICITE WATERPROOFS UNDER ALL CONDITIONS

SAL-FERRICITE & TRADING CO. LTD.

748, FULHAM RD., LONDON, S.W.6 Phone : PUTney 1301-2

119, VICTORIA ST., LONDON, S.W.1 Phone VICtoria 9331-2

ESTABLISHED 1844

Stearates. Driers-Cobalt, Lead, Manganese, etc.
Salts of Antimony, Bismuth, Cadmium, Copper,
Iron, Lead, Mercury, Potassium, Sodium and Zinc.
Phosphates, Chlorides, Sulphides, Acetates,
Oxalates, Tartrates. Analytical Reagents.
Pharmaceutical Products. Luminous Pigments.

Sterling BRAND Chemicals

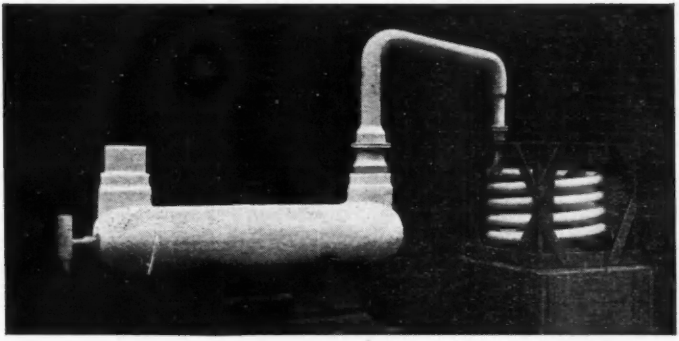
THOS. TYRER & CO LTD.

STRATFORD, LONDON, E.15.

PHONE MARYLAND 4874 (5 lines) CABLES TYREMIEUS LONDON CODES ABC, BENTLEY'S

Greenwood

PURE DISTILLED WATER



CAN BE MADE IN

fused silica equipment. Many analytical and manufacturing processes require the purest distilled water, free from metallic contamination and ammonia, even of conductivity water purity. According to many authorities the only suitable material for the still and condenser is pure fused silica and VITREOSIL has been and is being extensively used.

VITREOSIL

made by

THE THERMAL SYNDICATE Ltd.

Head Office :
WALLSEND,
NORTHUMBERLAND

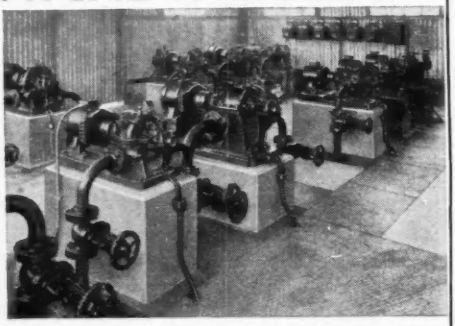
London Depot :
12-14 Old Pye St., Westminster,
S.W.1

WORTHINGTON—SIMPSON
PUMPS for the CHEMICAL INDUSTRY

SPECIAL MATERIALS USED TO SUIT THE LIQUORS HANDLED

Steam or Power Driven Pumps. Dry Vacuum Pumps. Wet Vacuum Pumps. Air Compressors. Steam Jet Air Ejectors and Surface Condensers for Operating with Vacuum Pans. Heat Exchangers.

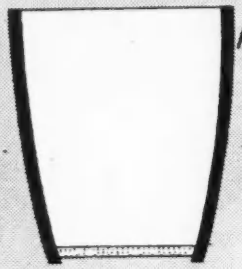
Worthington-Simpson's Name on any Machine is a Guarantee of High Quality and Reliable Performance.



An Installation of twelve electrically-driven Horizontal Split Casing Centrifugal Pumps at an important Chemical Works in the Midlands. These units handle a variety of Chemical Solutions used in various manufacturing processes.

WORTHINGTON-SIMPSON LTD., NEWARK-ON-TRENT.

FILTER CRUCIBLES



WITH POROUS PORCELAIN BASE

Made of **ROYAL WORCESTER LABORATORY PORCELAIN**

are now available in several sizes, but at present in only one grade of porosity. Other grades are in course of preparation and it would assist the manufacturers—The Worcester Royal Porcelain Co., Ltd., if Chemists requiring articles with Porous Porcelain would send enquiries and suggestions to :—

Norman Sheldon, A.R.C.S. (*London*) **A.I.C.**
19, Charing Cross Road, London, W.C.2

who is guiding the Company as to the needs of users.

POROUS PORCELAIN FILTER CRUCIBLES are a great improvement on the Gooch Crucible and will hold back fine precipitates. They are not affected by acids, and can be heated to a much higher temperature than sintered glass.

Supplies can be obtained by all registered Laboratory Furnishers.

THE WORCESTER ROYAL PORCELAIN CO., LTD.

MAKERS OF THE BEST LABORATORY PORCELAIN.

B.B.T.

PASS IT ON

So long as you keep any transport vehicle, wagon, lorry, canal-boat or ship — so long is it kept from someone else who needs it. There are still enough vehicles to go round, provided they *do* go round!

It is true to say that the whole transport system of the nation is in the transport users' hands. Will you hold on to that vehicle — or pass it on? The country asks you to save 10 minutes from each hour of standstill time. It is vitally important that you do so.

You know your own problems best. Tackle them in your own way.
But tackle them now. Plan, encourage ideas, improvise if needs be.
Here's a starting-off agenda:

1. CLEARLY WRITTEN LABELS **2.** LABOUR-SAVING EQUIPMENT
3. BLACK-OUT WORKING **4.** OPINIONS OF "MEN WHO DO THE WORK"

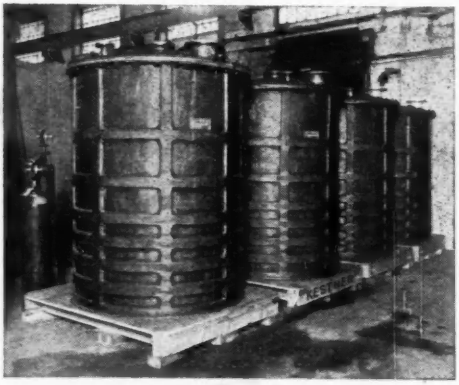
WE MUST GET AN EVEN

QUICKER TURNROUND

Ministry of War Transport.

5

KESTNER LEAD LINED PLANT



Lead lining of all types by skilled craftsmen.

HOMOGENEOUS LEAD COATING
SHEET LEAD LINING
LEAD ALLOY CASTINGS

Plant designed for special purposes, or manufactured to clients' own drawings.

Kestners have been making lead lined plant for over 30 years, also coatings in lead and regulus up to 5 tons weight.

KESTNER EVAPORATOR & ENGINEERING CO. LTD.
CHEMICAL ENGINEERS - - - **5, GROSVENOR GARDENS, LONDON, S.W.1**

A note on

VATS *and the timber shortage*

We still posses limited stocks of the usual imported timbers suitable for chemical Vats, but to save shipping space it is important that whenever possible home-grown timbers should be used instead. We have stocks of high quality English Oak and English Larch in seasoned condition and we hope that our customers will co-operate by considering the use of these timbers for their Vats wherever possible.

Further note- **Since the war began we have so far fully maintained our pre-war high standards as to quality and seasoning of timber, and it is our intention to continue thus. If, however, circumstances should at any time compel otherwise, any quotation affected would contain an appropriate notification.**

CARTY
AND SON, LIMITED
Harders Rd., Peckham, LONDON, S.E.15
Phone: New Cross 1826

The Chemical Age

A Weekly Journal Devoted to Industrial and Engineering Chemistry

BOUVERIE HOUSE, 154 FLEET STREET, LONDON, E.C.4

Telegrams: ALLANGAS FLEET LONDON — Telephone: CENTRAL 3212 (10 lines)

GLASGOW: 116, Hope Street (Central 3970) — BIRMINGHAM: Daimler House, Paradise Street, (Midland 0784-5)

THE CHEMICAL AGE offices are closed on Saturdays in accordance with the adoption of the five-day week by Benn Brothers, Limited.

VOL. XLVII
No. 1222

November 28, 1942

Annual Subscription, 21s.
Overseas, 26s.

The Scientist as Writer

SOME few weeks ago, reference was made in our "Notes and Comments" column (July 25, p. 75) to a discussion of the failure of the scientist to impart his science to the common people. One view quoted was that "the exacting and engrossing nature of scientific research" is responsible for the inability of the "average scientific worker" to express himself. More recently, in the same column (August 22, p. 179), Shelley and Goethe were instanced as writers who showed lively appreciation of contemporary scientific thought. Is it not possible that these two notes, by their negative as much as by their positive implications, constitute a lively indictment of scientific education to-day?

From time to time the lament goes up that scientists who know their science are unable to impart it to Horace's "vulgar throng." And yet the English language is the medium by which, from an age which is more usually measured in months than in years, we express our wants, our beliefs and our imaginings. If, after lifelong experiment in this way, we are unable to be precise in such expression, how can we be accurate in our scientific lives? Our training in science must inevitably have been shorter than our contacts with the spoken and the written words of our mother tongue. There is surely a fundamental error in an educational system which permits chemists to be regarded as fully qualified when they are unable to use their language with at least a moderate competence. But the implications of this lack in the armoury of the scientist go even deeper than at first sight we might imagine. If scientists, who are trained for accuracy, cannot (and it would seem that in fact they cannot) use the English language in order to express their meaning, how much more slipshod and nebulous must be the language of those without a scientific training. Many a time, for instance, we have heard a politician berated for the vagueness of his promises—though this vagueness, it must be admitted, may as often be the result of design as of inability to achieve lucidity. The columns of the daily press likewise too often tend to give an entirely false impression, but, in this instance, it should in fairness be noted that, since people who cannot express themselves precisely cannot be expected to interpret accurately even the precise utterances of others, faults may be apportioned on both sides.

On Other Pages

Notes and Comments	... ...	458
Cartoon by Neil Nettleton	...	459
Observations on Polishes	...	461
Belgian Chemical Industry	...	464
Chemicals for Gold Mining	...	465
Low-Temperature Carbonisation		467
A Chemist's Bookshelf	...	468
Corrosion and Paint	... ...	470
Controlling Cement Manufacture		471
Parliamentary Topics	... ...	472
Methyl Methacrylate Polymer	...	473
Letter to the Editor	... ...	474
Scientists' Council	... ...	474
Personal Notes	... ...	475
New Control Orders	... ...	475
Fortified Flour	... ...	475
Prices of British Chemicals	...	476
General News from Week to Week		480
Forthcoming Events	... ...	482
Commercial Intelligence	...	482
Stocks and Shares	... ...	483

There is much talk just now about the scope of post-war education. Is it too much to hope that we may have the opportunity of training a generation of people from among whom no one without a precise and clear grasp of the English language shall be allowed to put his thoughts, confused or otherwise, before the public? And that, on the other hand, the public should be trained to understand plain language once it has been propounded? It would be profitless to discuss the exact political, economic, and social benefits to be derived from such an educational revolution, but it is surely safe to assume that they would be widespread.

However, we are at the moment more concerned with the scientist than with the ordinary run of people, and must return to the statement already quoted regarding the exacting and engrossing nature of scientific research. This statement is at best evading the issue. What should we think of the physical chemist who became so engrossed in his work as to neglect the study of chemistry—or even of mathematics? Or, to take a more homely example, what of the carpenter who refused to handle a saw on the grounds that he hadn't had time to learn to use it? In the last analysis, for all his laboratory practice, words form one of the tools of the scientist. If, then, the scientist fails to become master of his tools, his workmanship is suspect.

In actual fact, the scientist as author should be the rule, not the exception. And by *author* is meant not merely a scientific propagandist, but a writer of anything from the humble (though lucrative) detective novel to the epic in prose or verse. The good scientist possesses, in addition to his precision, an imaginative power capable of application to fields other than those purely scientific. The argument that it is impossible to write and simultaneously to carry on scientific work, may be countered by the question: How many competent first novels have been the work of people who were not "writers" by profession? The pursuit of letters is anomalous in that it is one which may be practised by people in all the diverse walks of life.

While scientific *geniuses* might perhaps be excused on the grounds that their services are more useful in the narrower field, it is significant that many scientists of the first rank *have* been able expositors. And many of our present-day scientists, though capable, are not geniuses in the same sense. It is some of those people who could with advantage in their spare time essay some experiments with printer's ink. We are not pleading that every scientist should, here and now, sit down and write "the novel of the century," but we do ask that scientific training should enable some scientists to decide that science and literature are not mutually prohibitive pursuits. Only when it is no longer startling for the chemist to wield the pen with the same facility as the test-tube, or to dream of rivalling Dorothy Sayers, James Thurber, or Walter de la Mare—only then can we feel satisfied that scientific exposition will merit the attention of the people.

NOTES AND COMMENTS

Pictorial Comment

MANY a chemical proposition is more helpfully illustrated by a graph than by any number of words and formulæ, and the same may be said of more general propositions. Accordingly, we propose from time to time to add to these written comments a graphic comment in the form of a cartoon, the first of which appears on the page opposite. We are far from being artistic ourselves; if we can produce an intelligible diagram we consider we are doing pretty well. So, in order to make our graphic comments perspicuous, we have enlisted the services of an artist who is well known for his cartoon work in other journals—Mr. Neil Nettleton. Like most of the rest of us, Mr. Nettleton has other calls on his services these days, and, though at present the call has not yet taken him out of this country, there is no knowing what may happen. Unlike the editor of a journal, whose personality is veiled beneath the pontificial "we," the cartoonist has a distinct individuality; and though his subjects may be dictated by the policy of the paper he draws for, his pencil must follow the dictates of his own peculiar talent. We

"N_2O" by Neil Nettleton

TRADE SECRETS

Industrial Chemist: If those chaps can get together, I don't see why we shouldn't.

can only hope that the continuity of Mr. Nettleton's contributions will not be broken by more important calls upon his time. At the moment, we intend to publish a cartoon on the last Saturday of every month. The indulgence of our readers is asked if war-time conditions are such that irregularity of one kind or another should foil our plans.

A Council for Scientists

THE setting up of a Joint Council for Professional Scientists, referred to later on in this issue, is important enough in itself, but with the shelving of the parliamentary motion for the establishment of a Central Scientific and Technical Board it gains additional importance. If qualified scientists are not yet to receive official recognition, there is all the more reason that they should take some action among themselves to voice their common opinion on matters of public interest. The great thing about the present Council is that it goes further towards the co-ordination of interests of various sorts of scientists than anything yet in existence. The powerful Institutes of Chemistry and Physics have gone beyond the bounds of their own professional provinces, and have invited the association of botanists, geologists, mathematicians, and zoologists. The place of the scientist in the community is very much the same, no matter what line he follows; his education should start from the same basic principles; his ethical code maintains the same standards. The voice of the Joint Council should be loud and clear; and we look forward to hearing its first pronouncements with a great hope for a clarification of the position to be held by the scientist in out national policy.

Digging for Gold

THE Irishman in that popular ditty, *The Mountains of Mourne*, took a hand, as is well known, in digging for gold in the streets of London. To-day,

he would probably be digging for base metals, if he had emigrated to Canada or the United States; had he remained at home, he would, being an Ulsterman, be employed on even more active work. At all events, digging for gold is not to-day the popular occupation it once was. Mr. R. R. Stokes, M.P., does not like the idea at all, and judging by a recent question of his in the House of Commons, he has grave suspicions that too much gold-digging is going on in this British Empire of which he is so stern a critic. He has been told that no less than 460,000 people are digging for this erstwhile precious metal, most of them, he implies, in Canada, Australia, and South Africa. We believe that Canada, at any rate, and probably Australia also, are well on the way to following the example of the United States in transferring labour from their gold mines to the more urgent job of getting base metals out of the earth. South Africa is another matter. We have already reviewed her gold-digging problem, and though we are far from agreeing with all the opinions of Mr. Stokes, in this case it would appear that he has hit on a point that will bear further investigation.

Industrialists Watch the Moon

THE weather is still beyond the control of man. But its discussion in print—or even in public—is governed by law in war-time and is a subject that is best left out of all but the most casual and unscientific conversation. The moon, however, is a different matter. Its comings and goings have been so accurately and universally charted that the enemy can glean no useful knowledge that he did not possess before from a frank consideration of its movements. The industrial life of the country is, in one important respect at least, affected by the phases of the moon. It has been found by the secretaries of industrial associations that—apart from the weather—the intensity of darkness is the greatest single influence on the attendance at evening meetings. The presence or absence of an important member may have a distinct influence on the proceedings. So more and more secretaries are studying the moon in order to arrange their meetings so that full benefit can be derived from this uncontrollable breach of the black-out.

Germany's Economic Losses

THIS war has, until recently, offered little to the student of economics, on the completion of large-scale military operations, save a lugubrious recounting of fresh lists of raw materials of warfare denied the Allies. There has usually followed new restriction in the use of one class of goods or another which require these materials for their manufacture. It is comforting to think that the Nazis—less publicly than we, no doubt—are themselves totting up the deficiencies now to be expected in the war supplies which have for some time been reaching them from North Africa and through Marseilles. Apart from the "present" to the Allies of hundreds of thousands of tons of merchant shipping, huge quantities of minerals and foodstuffs will now be retained on the African coast. The rest of the continent of Europe may suffer to a small extent, but the biggest losers will undoubtedly be the Germans. The Nazis made it their first duty to see that they never went short while supplies were available, irrespective of the ownership of such supplies. The German armistice commission requisitioned 80 per cent. of all imports arriving at Marseilles.

Phosphate Supplies Dwindle

IN the period from January to August, 1942, French North Africa exported 250,000 tons of iron ore to the mainland of Europe and 25,000 tons of manganese ore. More than a million tons of phosphates went the same way. It is estimated that Europe has been existing on half its normal supplies of phosphatic fertilisers. The continent will now be reduced to about a quarter of its normal needs, although the effects of this shortage will be little noticed in the 1943 harvest. About 12,000 tons of oilseeds and vegetable oils went to Marseilles from French North Africa in the period from January to August, 1942, apart from a large quantity to Italy. North Africa produces cobalt but, although a small amount crossed to Europe in 1941, there is no record of imports at Marseilles during 1942. In addition to these products, France—and through her, Germany—received thousands of tons of wines, hides, wool, fish, wheat, fruit, and vegetables, as well as many thousand head of sheep from North Africa.

Observations on Polishes

New and Substitute Raw Materials

by GEORGE S. COLLINGRIDGE

PROGRESS in polish manufacture during recent years has been in the direction of adopting new waxes, emulsifying agents, and dyestuffs. In this present stage of total warfare, most of the natural waxes are in short supply, or else are unobtainable for use in polishes. The soaps of triethanolamine and stearic acid, etc., were, until fairly recently, utilised on an expanding scale as emulsifying agents in polishes. Nowadays, the supply of mono-, di- and triethanolamines has had to cease temporarily for the production of boot, shoe, furniture and metal polishes, in so far at least as these are retailed to the general public. Certain Ministry of Supply priorities must be taken into account, but in most cases recourse must be had to substitutes. Some of these latter are referred to in the paragraphs that follow. Raw materials utilised by polish manufacturers include waxes and wax-like fats, solvents, oils, resins, emulsifying agents, abrasives, detergents, dyestuffs, and perfume compounds. Naturally, not all of these are likely to appear in the same formula, but collectively they represent the chief basic constituents of shoe, floor, furniture, automobile, metal and similar polishes.

Natural Waxes

Prominent among the waxes are beeswax, paraffin wax; carnauba and candelilla waxes; montan wax, ozokerite, and ceresine. Chemically, the term "wax" denotes a substance consisting of esters of the higher molecular fatty acids with the corresponding alcohols, admixed with the free forms of these constituents. Tallow-like substances such as Japan wax, which are actually fats and not waxes, are nevertheless loosely regarded as waxes, from the point of view of polish manufacture. Other useful waxes not listed above include Chinese insect wax, shellac and fibre waxes, spermaceti, and the English so-called "wool wax." Having regard to the origins of montan wax (Germany), carnauba wax (Brazil), candelilla wax (Mexico), ozokerite (Poland, Rumania, Persia, U.S.A.), petroleum hydrocarbons (U.S.A.), fibre wax (Spain and North Africa), insect wax (China) and Japan wax (Japan, China, Indochina)—it will be readily appreciated that the opportunity of replenishing stocks in war-time is pretty remote.

Synthetic Waxes

Various synthetic wax products have appeared on the market during recent years, and have become more and more widely accepted by polish manufacturers. Glyco wax (glycol-stearic acid ester) and glyceryl stearate are of considerable utility, as well as products of the chloronaphthalene (I.C.I. Seekay waxes) and cetyl/stearyl alcohol (Lanette wax) types. A typical range of available synthetic waxes possess pale colour, high melting point, low acid value, low specific gravity, and good solubility in the usual solvents. Such waxes should be miscible with other waxes and resins, etc., and should not crystallise or "bloom" even in the presence of water. Some synthetic waxes are of further utility for specialised applications, in that they are self-emulsifiable. A speciality known as "Dribrite Emulsion" (Scott, Bader) is a wax emulsion suitable for application to most surfaces and dries to a bright film spontaneously. The gloss may be still further increased if desired by slight polishing. The wax film after deposition and exposure to light and air for a short period becomes insoluble in water.

Auxiliary non-waxes used in polish manufacture include stearine, oleine, rosin, liquid rosin (tall oil), linseed oil, sulphonated oils, hard soap, etc. Solvents include turpentine, white spirit, kerosene, benzol, dipentene, pine oil, carbon tetrachloride, trichlorethylene, acetone, and various hydrogenated phenols. Emulsifying agents for different kinds of polish may be enumerated as: self-emulsifying waxes, soap, diglycol stearate, commercial glyceryl monostearate, sulphated fatty alcohols, lanolin and lanolin absorption bases, ammonia and morpholine soaps, methyl cellulose, bentonite, and inert gelatinous alumina. Some of these are quite unsuitable for general application but are nevertheless included because of their occasional utility.

This country, unfortunately, is poorly provided with natural indigenous sources

of abrasive materials. British ground sand is used in the cheaper and cruder abrasive-type polishes, and there are also said to be native deposits of tripoli or rottenstone. One well-known supply house (Peter Spence and Sons) provides an extremely useful brand of amorphous silica. Then, of course, we have the valuable china clay workings in Devon and Cornwall. English chalks are also world-famous. Emery, ordinary corundum, kieselguhr, and many other important abrasives are, however, obtainable only from abroad.

Boot and Shoe Polishes

Whereas polishes for metals consist essentially of a detergent and an abrasive, wood polishes differ considerably, in that they are used for filling up irregularities and building a fresh, waxen surface. Leather polishes resemble floor and furniture polishes to some extent, but they must contain less active detergents than the former and more flexible glossing agents than the latter. Car polishes, on the other hand, are apt to be a curious mixture of two incompatibles —one being a fine abrasive to remove adherent dirt and the other a wax to impart smoothness and glass. For this reason, car polishes are frequently unbalanced, either on one side or the other; in fact, one very well-known car polish is marketed in two companion forms—one for cleaning and the other for subsequent polishing. Shoe polishes are usually sold as pastes or creams; less frequently as liquid creams. They may or may not contain solvents and/or water. In time of war, with both waxes and solvents difficult to come by, it would appear that an emulsified shoe polish containing water, but little or no solvent, would be well worth consideration. Here are two typical formulæ:

(a)	Carnauba wax	10.0 g.
	Paraffin wax	3.0
	Beeswax	3.5
	Curd soap	1.0
	Turpentine or substitute	2.0
	Rosin (colophony) ...	0.5
	Water	40.0
(b)	Crude montan wax ...	10.0 g.
	Beeswax	3.0
	Carnauba wax	2.0
	Japan wax	5.0
	Sodium carbonate ...	1.0
	Water (boiling)	75.0
	Borax	0.5 g.
	Diglycol stearate ...	0.5
	Hard soap	2.0
	Nigrosin	5.0
	Water (additional) ...	125.0

The various available synthetic waxes may, of course, be used to replace the waxes specified above. Stearic acid is also included in some formulæ. An interesting published formula for a shoe cream consists of carnauba wax 20 parts by weight, Japan wax 10, stearine 2, oil of mirbane 2, nigrosin 2, oil of turpentine 30, potassium carbonate 3, curd soap 8, and water 75. The molten waxes are incorporated with the solvents and dyestuffs. Potassium carbonate (or soda) and soap are dissolved in the boiling water. The second batch is then added to the first, and the emulsion stirred vigorously until uniform. All shoe creams of this type are based on waxes, emulsifying agent, and water. Some contain a proportion of solvent such as turpentine; others do not; the former are on the whole the more satisfactory, as they give a better and more easily produced gloss. The emulsifying agent is usually soap, present either through partial saponification of the saponifiable portion of the waxes, etc., used, or by simple addition of ready-made curd soap. Frequently both types of soap are present in the finished polish. When available, triethanolamine, stearic acid, potassium carbonate, curd soap, and rosin are all utilised in this connection. Wax mixtures should also be chosen, in certain cases, for their tendency to form ready and stable emulsions; in this connection certain proprietary waxes such as the self-emulsifiable Lanette Wax, Cosmolloid Wax and Bayer Wax III are of particular interest.

Emulsifiers and Solvents

Potassium carbonate is usually preferred as an emulsifying agent to caustic alkalies or sodium carbonate, owing to the fact that it gives a better finish to the polish, but nowadays soda or ammonia are the indicated alternatives. So far as solvents are concerned, there seems to be no doubt that the most efficient product is oil of turpentine. Küntzel, Malin, and others have demonstrated the superiority of turpentine over white spirit and decalin, in connection with the wear and tear and weather-

proof properties of shoe leather under normal conditions.

There is still a considerable market for white shoe polishes and, here again, substitute materials enter into consideration. Usually these liquid polishes consist of detergents, whiteners, and adhesive agents. Soaps, alkalis, and solvents provide detergency. To replace zinc and titanium oxides, I suggest that a good near-white grade of china clay be used. This can be brought still nearer the desired whiteness by a trace of ultramarine added to the finished product. Other whitening agents include precipitated chalk, lithopone, whiting, and white lead. Gums and gels usually act as adherents. In this connection, modern gum substitutes such as sodium alginate, inert gelatinous alumina, and methyl cellulose specialities may be utilised.

Metal and Car Polishes

Metal polishes have undergone several interesting developments since the days of oxalic acid and pumice mixtures. Soap and diatomaceous earths have been used, also soap admixed with silica. Afterwards came iron oxide and petroleum jelly, followed by mineral oil and abrasive mixtures. According to Searle, polishes for re-polishing metal, wood, and lacquered work contain as essential ingredients :

(a) A detergent to remove any "dirt."
(b) An abrasive to remove any tarnish and to remove any irregularities which cause the surface to be dull.
(c) A filler to occupy any interstices or hollows and so to produce a uniform surface. In some instances, the filler may also act as a coating and the surface of the filler then becomes the polished surface.
(d) A vehicle, which may also be a solvent, to facilitate the action of the other ingredients.
(e) Non-essential, yet often desirable, ingredients are a colour to improve the appearance of the polish and make it more attractive to the purchaser, and a perfume which may serve to mask unpleasant odours in the other constituents or may be added merely to increase the attractiveness of the product.

The detergents used in polishes are chiefly soaps of various kinds, but acids or alkalis are occasionally used. The vehicle may also have a detergent action which either supplements or repaces that of any other detergent. Only a very small proportion of detergent is advisable, as these substances tend either to destroy the surface of the polished article or to leave "smears" which only prolonged rubbing will remove. The use of a hard curd soap (sodium soap) as a detergent is almost invariably satisfactory, but soft soap (potassium soap) and various lime or magnesia soaps should not be used. The soap employed should contain no free fatty acid as this especially will tend not only to corrode the surface on which it remains, but also to produce smears.

Chemical Control

Although water has poor suspensory properties *per se*, and although it tends to evaporate readily, it is nevertheless a cheap and satisfactory vehicle for liquid metal polishes. Sedimentation is a problem that has to be faced, of course, but there is still nothing to prevent the chemist from improving the dispersion of abrasives by the addition of so-called colloidal kaolin, or by the judicious incorporation of gums, etc., in order to increase the vehicle's viscosity. A characteristic formula for liquid metal polish may be devised on lines similar to the following :

Hard soap	40 lb.
Sodium hexametaphosphate (optional)	0.3
Water	30.0
Oleic acid	5.0
Whiting	25.0
Ammonia (0.9)	5.0
Water	5.0
Oxalic acid	3.0
Water	15.0

Dissolve the soap and metaphosphate in the first batch of water, then stir in the remaining constituents in the order given. Allow to stand overnight before mixing, straining and filling. The water used should be distilled or softened.

Metal polishes made from purely British materials may include china clay, certain grades of silica, chalk, lanolin, lanolin absorption base (these fatty materials must be utilised with great circumspection to avoid smearing), methyl cellulose, soap, oleic acid, soda ash, etc. Thus a silver polish cake is made by dissolving 5 parts of hard soap

in 6 of water and then intimately mixing this with 15 parts of prepared chalk.

The *p*H of metal cleaners should be regulated to suit the particular metal to be cleaned. Zinc and aluminium are attacked if the *p*H of the cleaner is above 10; tin above a *p*H of 11; brass above 12.5; and high-silicon iron at a *p*H above 13. Soaps are often added to cleaners or are formed by the action of alkali on the grease removed from metals. They may cause difficulties in cleaning by forming insoluble calcium or magnesium soaps. This difficulty is avoided by the use of sulphonated higher alcohols which do not form insoluble calcium and magnesium soaps.

The manufacturing chemist should also remember that separation of the polish into two phases, one of which is a liquid, is an objectionable defect in polishing-pastes, and one that is sometimes very difficult to prevent. The larger the proportion of colloidal gel in the polish the greater is the liability to hysteresis, as this is a characteristic property of gels. Slight variations in the proportions of the different ingredients, in the mode of mixing, or even in the temperature of the materials will often prevent such separation. This defect is also caused by "freezing" the polish and then allowing it to thaw, as this treatment partially destroys the gel-structure. Only in rare instance is hysteresis due to the use of too large a proportion of liquid, as the amount of "weeping" which occurs bears little or no direct relation to the proportion of liquid in the original mixture.

I have personally experimented with success with a rather fine grade of metal polish, suitable for most household applications. It consists of a methyl cellulose "mucilage," containing sulphonated castor oil, china clay, and amorphous silica.

Some Patents

A patent owned by American inventor, Foster D. Snell, protects a metal polish consisting of a pulverulent abrasive, water, soap, and an ammonium salt. An example comprises 77-84 per cent. finely divided diatomaceous earth or pumice, 10-13 per cent. soda or potash soap, 6-7 per cent. ammonium oxalate or sulphate, about 0.5 per cent. light mineral oil and, possibly, up to 2 per cent. bentonite. A motor car polish specified in Canadian Patent No. 371,008 consists of a fine scouring material, light mineral oil, blown castor oil, a mineral absorbent for the oil, gum, and a little alcohol. It contains 50 per cent. water, minimum. A modern car polish (suitable for use after the war) might well consist of synthetic wax, sodium or ammonium stearate, china clay, a little mineral oil, and water. Additional constituents might include small proportions of sodium alginate, rosin, sodium oleate, sulphonated castor oil, glyceryl monostearate or diglycol stearate, and, of course, additional abrasives.

Little more needs to be said on this subject at the present juncture. Floor and furniture polishes are fairly well covered by the foregoing remarks—at least, in so far as the peculiarities of war-time conditions are concerned. Much of the really valuable work is already accomplished by the manufacturers of substitute waxes and alternative types of emulsifying agents, solvents, and abrasives, before ever these raw materials reach the actual polish manufacturer. Now, more than ever before, the trade depends heavily upon its tried and trusted sources of supply. Generally speaking, the utilisation of existing stocks and the investigation of suitable substitutes have been remarkably well carried out.

Belgian Chemical Industry

Report of the Union Chimique Belge

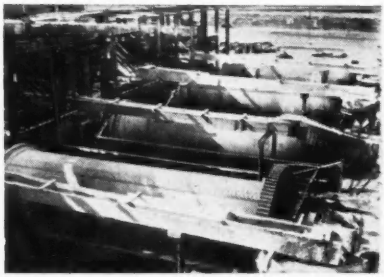
AFTER two years without paying a dividend, the Union Chimique Belge has resumed its usual pre-war 5 per cent. distribution, on a capital of 200 million francs. The annual report states that the company has made increased efforts in the field of fertiliser production. Union Chimique Belge has taken the "Safea" factory at Houdeng-Goegnies on lease and has installed its own machinery for the production of ammonium sulphate. Sales have increased, especially of inorganic products, for agriculture and the textile industry, and a larger turnover is also reported for synthetic resins. More calcium, phosphorus and vitamin preparations were made for addition to foodstuffs, and the construction department erected a new coke-oven battery for a Belgian iron works. Construction work continued on the new factory of the Société Belge de Fibranne, a producer of synthetic fibres. Manufacturing activities in general, however, suffered from a shortage of fuel and from interruption of many raw material supplies.

Chemicals for Gold Mining

Latest Plant and Treatment Methods in South Africa

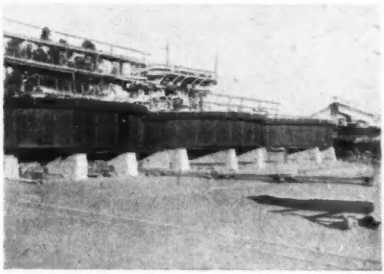
WHILE great progress has been made during the war in the expansion of South Africa's manufacturing industries, her economic wealth has been for so long bound up with the production of gold that a serious curtailment of gold-mining activity has become unthinkable to many people in that country. The Rand feels that for some years yet gold will be the chief basis of South Africa's claim to be a leading industrial country. Even during the war a great new plant, belonging to the Western Reef Exploration and Development Company, has come into production. The new reduction plant of this concern was arranged for an initial nominal capacity of 100,000 tons of ore per month and provision has been made to permit extensions up to 200,000 tons per month. It is great units such as this which are now being asked to curtail their operations and, while it is certain that a large shifting from gold mining to manufacture and the production of other minerals will take place, it is evident that the gold interests are going to put up stiff resistance to the move.

From the time—in 1890—that the cyanide process for the recovery of gold was started on a commercial basis, metallurgical practice has steadily progressed and has now



Tube mills that reduce the crushed gold-bearing quartz to a powder.

reached a state of efficiency where the total recovery of gold on one mine is as high as 98¼ per cent. The majority of the plants on the Rand still retain separate treatment for sand and slime, although all the latest plants grind the ore sufficiently fine to permit of treating the whole of the slime. A description of the latest treatment has been included in a publication of the South African Department of Mines: "Mineral Resources of the Union of South Africa." Where sand treatment is incorporated, states the writer, the final pulp is classified into sand and slime with cones or mechanical classifiers. The sand constitutes about 45 per cent. of the total ore and is collected in tanks of 40 to 55 ft. in diameter, fitted with filter mats and capable of holding 400 to 850 tons of sand. The excess water is drained from the sand, and, although in a



Cyanide tanks used in the extraction process at a Rand gold mine.

few cases the cyanide treatment is carried out in these tanks, it is more usual to transfer the sand therefrom by conveyor belts to other similar-sized tanks in which the treatment is given. Cyanide solution containing a maximum strength of .08 per cent. NaCN is pumped on to the top of the sand charge and this solution, in percolating downwards through the sand, dissolves about 90 per cent. of the gold contained therein. The gold-bearing solution passes through the filter mat and is sent to the precipitation section. The sand is given a wash with barren solution of low cyanide strength prior to being discharged to the residue dump. About 1.7 tons of solution per ton of sand are used and the total treatment occupies about five days.

The slime is settled in collectors of 40 to 70 ft. in diameter, the clear water or solution overflowing these collectors being returned to the milling section. The settled slime, containing about 40 per cent. moisture, is sluiced out of the collectors with cyanide solution into agitators, wherein the slime is kept in suspension by means of air or centrifugal pumps for four to twelve hours, during which time about 95 per cent. of the gold in the slime is dissolved. The cyanide strength of the solution in these agitators is about .015 per cent. NaCN and contains about 0.1 per cent. CaO. The ratio of solution to solids is about 1.25 to 1.

Having dissolved the gold in the slime, the next step is to separate the gold-bearing solution from the treated slime and this is

done almost exclusively by vacuum filtration, although some of the older plants still retain the decantation method of subjecting the slime to a series of washes with barren solution and subsequent settlements. Vacuum filtration is achieved with the intermittent Butters' filter or continuous rotary filters in which, by means of vacuum, the solution is drawn through a canvas cloth, leaving a cake of slime thereon which, after washing with barren solution, is discharged to the slimes dam. The solution from the filters is clarified by passing through a bed of sand and then sent to the precipitation section. In the most modern plants a continuous system of collection, treatment, and washing of the slime is carried out with Dorr thickeners, Dorr or Brown agitators, and rotary filters.

In the precipitation section, oxygen is removed from the solution by subjecting it to a vacuum before the solution is brought into contact with zinc which precipitates the gold, leaving a barren cyanide solution for re-use. The zinc is in the form of extremely thin ribbons closely packed in extractor boxes through which the solution percolates, or in the form of zinc dust which is added to the solution before it is sucked through canvas leaves on which the gold slime is deposited. Whichever method is used the gold slime is periodically removed, treated with sulphuric acid to remove the excess of zinc, filter-pressed and smelted. The residual zinc sulphate solution is used for underground timber preservation. Two methods of smelting are in common use on the Rand, namely, lead smelting and crucible smelting. In the former, the gold slime is mixed with litharge, carbon, and other suitable fluxes and charged into a reverberatory furnace, from which, after about twelve hours, lead bullion containing approximately 8 per cent. gold and slag is withdrawn. The lead bullion is then treated in a cupel furnace, in which the lead and base metals are oxidised and removed, leaving the gold, which is re-smelted and cast into bars for despatch to the refinery. In the crucible process, the gold slime is calcined, fluxed with borax, sand, and manganese dioxide, and smelted in clay-lined pots in a reverberatory furnace. The resulting gold buttons are collected, melted in plumbago pots and cast into bars, which are sent to the refinery.

All the bullion produced by the mines of the Witwatersrand and certain outside districts is sent for treatment to the gold refinery at Germiston. The refinery, which is a subsidiary of the Transvaal Chamber of Mines, was established in 1921 and its main functions consist of collecting the bullion from the mines, refining and realising it, and accounting to the mining companies for the proceeds. On the average, the bullion as received from the mines assays 889.2 gold, 82.3 silver, and 28.5 base metal. Upon receipt at the refinery, the bullion is weighed, melted, sampled and assayed, after which actual refining takes place. This operation is carried out by means of passing chlorine gas through the molten metal, thereby forming chlorides of silver and base metal which are removed and the chlorides again treated

[*Photo: South African Railways and Harbours*

The cyanide tanks of a Rand gold mine, near Johannesburg.

for the extraction of the silver. The average fineness of the refined gold produced is 996.0 and the silver fineness is 998.1.

The mining industry absorbs the bulk of South Africa's chemicals. Johannesburg gold mines require approximately 200 tons of explosives per day, cyanide valued at £1,500,000 a year, 80,000,000 detonators a year, and large quantities of other chemical products used in the refractory and refining branches. At the same time other industries in the Union are big consumers of chemicals. Agricultural demands, second to those in the mining industry, comprise 300,000 tons of superphosphates annually, besides organic nitrogen and potash fertilisers. Others utilising the Union's chemical output include the tanning, paper, canning, soap, paint, and pharmaceutical industries.

Local production has been stimulated by the fact that war has interfered with the supply of raw materials largely imported, particularly superphosphates. Some production has been achieved using rock from North Africa, but this supply was cut off by war. With the phosphate rock available in South Africa, plants have been able to supply local requirements, and the post-war prospects for expansion are good provided that there is an increased domestic output of sulphuric acid. This acid already has assumed importance because of its place in explosives manufacture.

Before the war approximately half South Africa's cyanide requirements were filled by imports, some from Germany. Local production has increased as these imports were cut off, but the local product is said to be inferior. War conditions likewise have increased production in the Union of chrome salts, sodium silicate, and sodium sulphide, and, since necessary raw materials are available, there is a prospect of this industry continuing in post-war years.

Low-Temperature Carbonisation

Methods which may be Adopted in German Four-Year Plan

FOLLOWING our notes on the development of low-temperature carbonisation in Germany (CHEMICAL AGE, October 17, 1942) more details are now available about the measures likely to be taken in that country. A big scheme is reported to have been ordered by Goering in his capacity as Commissioner-General for the Four Years' Plan. The phase of experiments, it is stated, has been finally ended, and there are no fundamental problems remaining to be solved.

There are several possible methods for the treatment of the tar obtained from coal by low-temperature carbonisation. Hydrogenation seems to be feasible only for tar extracted with circulating gases. Treatment with selective solvents requires preparatory distillation and yields as good qualities of diesel oil, fuel oil, and paraffin wax as are obtained by the same method from lignite low-temperature carbonisation tar. Cracking does not appear to provide a useful method of treating coal low-temperature carbonisation tar, though it may prove feasible in a hydrogen atmosphere at low pressure. Precipitation with benzene, propane, or butane has been proposed for the removal of asphalte; at the same time the phenols could be removed. Distillation proper is still being investigated; hitherto it seems to have suffered from the drawback that the output of fuel oil is comparatively small, while the yield of better oils is even less satisfactory. It may give better results in connection with hydrogenation. So far only pilot plants seem to be in actual production, though at least one large-scale works was reported to be under construction earlier in the year.

As far as tar obtained by low-temperature carbonisation from liguite is concerned, the present output seems to be very large, and by far the largest quantities probably go to the catalytic high-pressure hydrogenation works which treat the tar at temperatures of 350°-450° C. At the lower temperature lignite low-temperature carbonisation tar, which has undergone preparatory distillation, is treated for lubricating oils, diesel oils, and colourless paraffin wax. Cracking has been tried out in central Germany at pressures from five atmospheres upwards, but it has not found much attention. It is reported that cracking yields in one plant about 60 per cent. of cracking oils (in addition to 11 per cent. of gas and 25 per cent. of cracking pitch). Good diesel oils can be produced by cracking at pressures of from 1 to 3 atmospheres.

The treatment of lignite low-temperature carbonisation tar with various selective solvents has been tried in large-scale trial plants and yields mainly a good diesel oil and fuel oil, though there is hope that other selective processes (which do not yet seem to have been tried on a commercial scale) will yield petrol and diesel oil (after cracking) and fuel oil, asphalte, and electrode coke. Various distillation processes are available for the treatment of low-temperature carbonisation tar from lignite; one of these yields 5½ per cent. of petrol, 27 per cent. of diesel oil, 25 per cent. of paraffin oil, 10 per cent. of fuel oil, 10 per cent. of paraffin wax, 2½ per cent. of coke, and 10 per cent. of gas, but other grades of lignite tar would give somewhat different results

A CHEMIST'S BOOKSHELF

WORKS BOILER PLANT. By F. J. Matthews, B.Sc. 2nd Ed. London: Hutchinson. Pp. 176. 10s. 6d.

Practical books on works boiler plant are few and far between yet there was never so great a need for books of this character as there is to-day. The first edition of Mr. Matthews's book has been exhausted for some time and many of our readers will be interested to hear that a second edition has been published. Although plans had been made to enlarge the book by the inclusion of new subject matter, the exigencies of war have limited such changes and this book is substantially a reprint of the earlier edition. Some little rearrangement has been made in the text, but there is in fact no substantial change, although the contents have been compressed by rearrangement into eight fewer pages. This book is to be thoroughly recommended to all works engineers who are anxious to obtain a general text-book of a practical and not too advanced nature bearing on their work. The information it contains would, for example, admirably accompany the lectures on fuel which are now being given to so many thousands of engineers all over the country under the auspices of the Fuel Economy Committee of the Ministry of Fuel and Power.

TEMPERATURE CONTROL. By A. J. Ansley. London: Chapman and Hall. Pp. 127. 13s. 6d.

The subject of temperature control is exceedingly important and is growing in importance. There are few inorganic materials that are not subjected to some form of temperature treatment and in many instances the regulation of temperature must be controlled within narrow limits. The processes for which temperature control is required may be on the large manufacturing scale, as in the steel industry and in many chemical processes, or they may be the more refined operations of the laboratory. Within this range there may be wide variations in the temperature at which control is needed and in the degree of precision required. Automatic control is coming into ever-increasing prominence in industry and it is being recognised that the sensitivity of the regulator may depend upon the efficiency of the heat source and of the lagging or other operational factors of the furnace or apparatus controlled.

In this book an attempt has been made to describe some of the methods employed —a very useful work, since the sources of information on this practical subject are widely scattered in literature and are not generally accessible. The treatment does not claim to be exhaustive, but aims at providing dependable and simple methods. The general principles of control are discussed in a preliminary chapter, after which the book is concerned with describing specific methods. It is divided into liquid expansion controls, vapour baths and vapour pressure methods, metal expansion controls, gas expansion controls, electrical resistance, photo-electric control, and thermo-electric control. Three further chapters apply temperature control to scientific instruments, to liquid baths and to air baths, while appendixes deal with relays, galvanometers, a pressure manostat and tables of thermal constants. It will be seen that the book is wide in its scope. It is up to date in its treatment and can be recommended as a valuable addition to laboratory libraries.

THE APPLICATION OF ABSORPTION SPECTRA TO THE STUDY OF VITAMINS, HORMONES AND COENZYMES. By R. A. Morton. London: Adam Hilger. Pp. 226. 28s.

Such a co-ordinating review as this performs a very useful function when a branch of chemistry has developed to such an extent that the ordinary chemist, lacking the necessary specialist knowledge, is in danger of being unable to see the wood for the trees. Most chemists know something of the early investigations by Witt, Hartley and others of the relation between absorption spectra and the constitution of organic compounds; and most text-books of physical chemistry contain references to the effective use made in early days of absorption work in elucidating the structures of a number of relatively simple compounds. More recent work along these lines is not so well known; and it is not sufficiently realised that absorption spectra are still playing an important part in ordering the accumulation of data regarding a number of very large and complex organic series. Naturally the rôle is not as spectacular as in the proof of the structure of isatin, but it is well worth study. Dr. Morton's book not only gives some insight into the exceedingly complex field of natural products, but also indicates the extensive work that has been done on the absorption spectra of these products, and the general trend of work of this type.

The book is not easy to read, primarily because of the copious data which it contains in a necessarily compressed form. But it is worth concentration on the part of the reader to follow up the history of the vitamins and provitamins, hormones, coenzymes and other groups dealt with, and to see how the absorption spectra of these substances are an aid to the solution of many problems confronting the chemist. In addition to 75 diagrams and seven plates, there are five large folding charts which are most effective in illustrating the relations, both structural and spectroscopic, between the various members of large natural groups such as the carotenoids.

HANDBOOK OF INDUSTRIAL SAFETY STANDARDS (revised edition, including supplement on war-time production). New York: National Conservation Bureau. 55c.

The causes of accidents in industry are very diverse. Sound advice for safeguarding the worker has to be formulated from experience and much careful thinking; invention, too, has a part to play in the matter of providing means to minimise or completely offset a particular danger. The information incorporated in this useful compilation has been drawn from the numerous safety codes which have acquired the status of standards in the United States. The book does not set out to cover the entire field of industrial safety; it concerns just those aspects which are outstanding in the incidence of accidents, and the absence of provisions covering a particular situation does not imply that no safeguards are needed. In general the details of hazards and safe practice have been presented in abridged form, conveniently sectionalised, with reference to codes approved by the American Standards Association, the American Society of Mechanical Engineers, and other bodies, wherein more details may be sought. In all there are nearly 200 pages of information, including a supplement on aspects of safety which arise under conditions of war-time production. The numerous illustrations not only give details of safety devices, but show their application in practical situations. The book commences with an appropriate section on supervision, inspection and employee education, followed by one on the requirements of works' first aid stations. Thereafter come such matters as the valuable practice of resuscitation, the personal protection of the worker against hazards, works' sanitation, illumination, planning of exits, with stress laid further upon the common accident of tripping and falling. In more detailed treatment come the essential safety features needed in connection with various types of plant and machinery. The book is recommended by the United States Office of Education; it is indeed, a really practical guide to the detection and elimination of hazards and unsafe practices in industry.

THE ADVANCEMENT OF SCIENCE. Vol. II. No. 7. London: British Association. Pp. 96. 5s.

The present volume contains as its main contents the reports of the Transactions of the Conference on "Mineral Resources and the Atlantic Charter," held in London by the Division for the Social and International Relations of Science on July 24-25. A review of the addresses of an impressive number of experts on the mineral resources of the world, which dealt with the subject from every useful aspect, was contained in THE CHEMICAL AGE on August 1, but it is convenient to have in a single volume the verbatim reports of their sayings, as well as of the presidential addresses at each session, which covered the question of world resources from an even wider point of view. In addition a note is appended by Sir Harry Lindsay, Director of the Imperial Institute, outlining the work of the Institute on the development of the mineral resources of the British Empire.

Fuel Economy Review

Furnace Operation: Producer-Gas Plant

THE subjects covered by the 1942 issue of the *Fuel Economy Review* (the 21st volume to be produced by the Federation of British Industries) are of special topical urgency. With the general aim of encouraging, by improved operation and more careful supervision, further substantial savings in factory fuel consumption, the writers bring expert knowledge and first-hand experience to such vital matters as the re-removal and utilisation of condensate, the efficient operation of heating furnaces, and water treatment for modern steam generating plant.

The significance in these times of producer gas is well covered by the contents of the *Review*, which include an article on the operation and maintenance of producer-gas plant for industrial purpose, a second article on the right selection of bituminous coals for use in gas producers, and a short note on gas-producer calculations. Practical advice is also given on other aspects of efficient fuel practice, including notes on indigenous liquid fuels, the problem of pumping hot feed water, and the petrol consumption bonus schemes for road transport vehicles. The price of the *Review* is half-a-crown.

PALESTINE'S CHEMICAL WORKS

Among new chemical factories in Palestine may be mentioned: Carbidan, the first carbide plant, at Ramat Gran; Malton Chemical Works, Ltd., producer of lactates and lactose, also at Ramat Gran; Jordan Chemical Works, manufacturers of solvents, at Tel Aviv; Palacid, Ltd., producer of nitric acid and sulphuric acid, at Haifa Bay; Vita, at Tel Aviv, producers of ether and mineral and medicinal waters; Taassiyah Chemith, Tel Aviv, manufacturer of sulphite, liquid ammonia, and insecticides; and Topas-Werke, producing pectin, citrus alcohol, and lemon oil. Since the last war about 1800 factories have been established by private capital and industrial production now reaches a value of about £P 14,000,000.

Corrosion and Paint

Work of the Chemist in Protecting Metal Surfaces

AT a meeting of the London section of the Oil and Colour Chemists' Association on November 21, Dr. T. P. Hoar, of Cambridge, gave an address on "Corrosion and Paint." Dr. Hoar explained that, with one or two exceptions, metal surfaces were covered with a film of oxide which, while more or less complete, had certain gaps in it—pores or fissures—and that corrosion depended very largely on what happened when corrosive influences came into contact with the metal through these pores. The object of the chemist was to put something into the environment of the metal which would repair the oxide film, for if the film was in a perfect state there would be no corrosion. A film of paint was porous and susceptible to mechanical breakdown, chemical aging, and so on, and very often it was impossible to exclude corrosive influences from the metal under practical conditions. Therefore it was necessary to try to protect the metal underneath the oxide film. This could be done by making a corrosion product form in the pore or fissure of the oxide film. One method which had not yet received a great deal of study was the inhibiting power of nitrite. With a nitrite solution it was possible to inhibit corrosion for all practical purposes, but the nitrite mechanism was by no means established yet and it was the sort of thing which would have to be left until after the war.

Zinc and Lead Compounds

The use of zinc chromate paint had not been found so good in an industrial atmosphere as red lead, and a zinc chromate-zinc oxide mixture had been found to be considerably better than zinc chromate. Red lead was pre-eminently a priming coat but the mechanism of its action was not understood, and a real investigation of red lead inhibition was very necessary. A thing he would like to see was a film of lead with an oxide film on top of it—say, litharge—painted with an ordinary linseed oil paint either without a filler or with an indifferent filler. The lead should be dissolved from behind and the back of the film examined by X-ray analysis to see whether it had absorbed water or not.

There were several kinds of adhesion of a paint film to a metal surface. The first one was mechanical; better adhesion was obtained if the surface of the metal was rough or porous, but he was not so much concerned with that. Was there chemical or physico-chemical adhesion? The thing to remember here was that metal surfaces were not really metal at all but an oxidised surface. The chemical reactions with the oxide film were the important thing rather than the chemical reaction of the metal surface. This had been studied, but he did not think anything had been done to find out whether there was any real reaction of the paint film with the oxide.

Bridge Painting

In the discussion that followed Dr. Hoar's address, Mr. N. A. Bennett said he had to do a great deal of inspection of bridges that had been painted with all sorts of paints and had been particularly interested in Dr. Hoar's views on adhesion. It was said that modern red lead was not as good as the old material that was mixed up on the job, and if one looked at the bridges built by Brunel and Telford there was much to be seen which supported that view. Brunel seemed to have oiled the plates at the time of milling and he also put on innumerable coats of red lead. It was a costly method, but it was worth it. The more modern practice of applying a hot waxy type of coating had not been very successful here—although very few people had tried it—but it had had some success in America. If a hot coating was put on to cold metal there were adhesion troubles. The British Oxygen Company was taking up the question of corrosion of metals in a very practical way. They were making what was called a de-scaler, which was an oxy-acetylene flame designed to work with a slightly reducing atmosphere. This was fed to the corroded surface, and the corrosion came off in big chunks. He had seen pieces half an inch thick. Whatever might be the value of this from the point of view of cleaning the metal there was no doubt it left a hot dry metal, and that was important from the point of view of painting afterwards.

Dr. H. B. Footner emphasised the point made by Mr. Bennett as to the value of a hot dry surface to ensure perfect adhesion of the paint. When he was inspecting petroleum tanks in Bombay some years ago he found the surfaces had been coated with two coats of red lead and two coats of a good quality white paint. The plates were partly covered with mill scale and partly rusted. Over the mill scale there was very little rust—the scale was still blue underneath and practically continuous—but the whole four coats of paint had perished and could be flaked off quite easily, whereas on the steel alongside where there was no mill scale the adhesion was excellent. There appeared to be some action—physical or chemical and probably both—and he would welcome views on this point. With regard

to the use of sodium nitrite as a corrosion inhibitor, it was largely used in the United States for preventing corrosion in petroleum pipe lines, being injected in the form of a solution. Laboratory experiments suggested that a two per cent. solution would be sufficient but practical experience showed that a 20 per cent. solution was necessary.

Dr. Hoar replied that any surface that had an incomplete covering of mill scale was very bad to paint over. The thick oxide film of mill scale acted as a cathode and the other part of the plate acted as an anode, and the trouble started in that way. He did not know before of the use of sodium nitrite in petroleum pipe lines.

The chairman (Dr. H. W. Keenan) said Dr. Hoar had not touched on the properties of metallic lead. His own experience was that when introduced into suitable pigments there was hardly anything to touch them. An experiment was going on at the present time which he could not refer to in detail but the results seemed very promising.

Controlling Cement Manufacture

New Methods Bring Simpler and Surer Operations

DESPITE the excellent qualities of the cements available to industry, the makers of cement labour under the disadvantage that their raw material is liable to vary considerably in chemical composition. It is a well known fact that the secret of cement quality depends upon the correct ratio of lime to the other constituents, such as silica, alumina, and iron. In some instances the raw material has been modified by adding more limestone, or materials rich in silica or alumina, but exact control over quality cannot even then be obtained because the modifying constituents have varied from batch to batch in the same way as the basic material.

Flotation Process

In order to overcome these difficulties some manufacturers of cement have developed a flotation process which enables the plant to turn out a final product of any desired composition without correction and irrespective of the calcium carbonate value of the raw rock. This process, it is claimed, has many advantages. In the first place, quarry costs have been considerably decreased, as the rock may be quarried without care in selection, and blending prior to grinding is unnecessary. Secondly, it is claimed that there has been an important material gain in early and ultimate strengths of the cement, in view of the elimination of all quartz grains coarser than 325-mesh and the correction of the silica-iron-alumina ratio. Any known type of cement can now be made at will by controlling the recombination of the constituents segregated in the separation plant.

Thus the available materials can serve as the source for "low alumina," "high silica," "alkali-resisting," and other types of cement. One of the most interesting features is the fact that the mill savings resulting from the use of the new process have more than offset its cost, and these savings are in addition to the savings in the quarry itself. The two major mill savings are decreased raw and clinker grinding costs and lower fuel consumption. For example, rock ranging from 68 to 75 per cent. calcium carbonate is ground to approximately 85 per cent., passing a 200-mesh sieve. As the excesses of silica and alumina are removed deliberately from the coarser products of the tube mill the kiln feed ranges from 90 to 92 per cent., passing a 200-mesh sieve. With the new process, if desired, all the tube-mill products can be subjected to froth flotation to effect the separation between the calcium carbonate and the argillaceous compounds. In the usual way, however, this is not found necessary or desirable, as quantities of the fine constituents are essential to the final composition in most cases. Accordingly, it is the practice to treat a variable quantity of the coarser particles separated from the mill stream, the quantity so treated varying inversely as the calcium carbonate varies in the stone as received. This makes it possible to remove the excess silica and alumina in a single operation, but as the silica is the constituent requiring the primary control, the separation of the original material into coarse and fine parts is based on the excessive silica content of the raw material in this instance.

Hydro-Separation

In operation, the tube-mill slurry is delivered to a hydro-separator after sufficient water has been added to result in a dilution to approximately 20 per cent. dry solids. The hydro-separator serves as a 325-mesh sieve, the fines overflowing and being delivered directly to the final 80-foot thickener. To complete recovery of the fines the underflow is pumped to a rake classifier, where the final separation and control of the treated and untreated parts is accomplished. At the degree of fineness mentioned above the sands do not represent a sufficient tonnage for treatment to remove the excess silica. These sands, however, include the uncombinable sizes, which may be arbitrarily stated as coarser than 325-mesh.

They are allowed to precipitate and are recovered by the rake elements and delivered to a turbo-mixer. The necessary additional tonnage required for treatment is admitted through a perforated bleeder pipe extending across the rake box above the rake elements. This bleeder pipe serves as the control of tonnage and actually accomplishes the final analysis of materials combined in the thickener. Particles withdrawn by the bleeder are the coarser products, and the finer particles, allowed to overflow, are combined with the fines classified in the hydro-separator. To make the separation more accurate the overflow from the rake classifier is returned to the hydro-separator, where it overflows to the thickener.

The collecting reagent, oleic acid, is added to the pulp discharged from the turbo-mixer, which is then fed to a group of four flotation cells. In these cells, known as the "rougher cells," the frothing agent, cresylic acid, is added, and, together with the aeration, causes the calcium carbonate particles to be segregated from the argillaceous compounds and recovered with the froth. The underflow from these cells contains lime values, and is further treated in a series of three "cleaner cells." Froth discharged from these cells is of lower quality than that of the rougher cells, and it is further treated in a series of two "recleaner cells," the froth of which is combined with that of the rougher cells to form the final lime concentrate. This concentrate is delivered to a 27-foot thickener. The underflow from the recleaner cells circulates through the three cleaner cells with the underflow from the rougher cells, the underflow of the last cleaner cell being the rejects or tailings of the plant.

Concentration

In order to obtain capacity with economy, no attempt is made to obtain an absolutely pure concentrate, one of 87 per cent. calcium carbonate value being the most economical and convenient for the materials available at the works. This concentrate is thickened separately, in order that the reagent water can be used continuously in circulation throughout the system to economise in reagents and to effect a further economy as the water is soft, for the calcium salts have been precipitated as calcium oleate. The underflow from this thickener is pumped to a junction box, where this stream is continuously combined with the overflow from the hydro-separator, the two streams being dewatered to normal slurry moisture content in the 80-foot thickener.

It has been found that quartz, silicates of alumina, and iron are readily separable from these tailings by concentration, but the table is ineffective in making a separation between calcium carbonate and the argillaceous compounds. A proposed improvement will enable the iron values either to be returned to the tube mills for further reduction or to be ground separately in a small mill and added to the products entering the junction box of the thickener. Since the separation plant was started the materials treated have ranged from 68 to 75 per cent. calcium carbonate, but in spite of this variation the underflow from the 80-foot thickener has been held to composition continuously, the error being so slight that blending has been entirely unnecessary. Thanks to the controls described, the routing chemistry is actually simpler than that required in ordinary practice.

Parliamentary Topics

Coal Products

IN the House of Commons last week Mr. Kennedy asked the Minister of Fuel and Power whether his attention had been drawn to a speech by the chief chemist of the Anglo-Iranian Oil Company in which it was suggested that the coal industry should be made a source of raw materials for synthetic rubber and plastics; and whether any action on the lines suggested was likely. In reply, Mr. T. Smith said he hoped that in the future coal would become, to an increasing extent, a raw material for the manufacture of such products, but reminded Mr. Kennedy that it had already been explained why the erection of a plant to make synthetic rubber from coal in this country would not be justified at the present time, and that the manufacture of plastics is already largely based on the use of products derived from coal.

Scientific and Technical Research

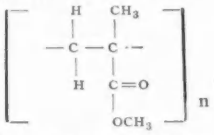
Mr. Salt asked the Minister of Production whether, following the appointment of the three scientific advisers to his Ministry, he would ensure that, when new inventions were submitted to the scientific advisers of service and other departments, their conclusions should be made available to some central co-ordinating body to ensure that any invention worthy of development would be taken up, although it might not concern the immediate production needs of the department to which it was submitted. In reply, Mr. Garro Jones, Parliamentary Secretary to the Ministry of Production, said that his Minister was satisfied that adequate machinery already existed for the purpose which Mr. Salt had in mind. This provided for full exchanges of information between the Supply and Service Departments and ensured close day-to-day contact at all levels between officers of these Departments engaged on Scientific and Technical Research and Development.

Methyl Methacrylate Polymer

Some Unusual Applications

A CONSIDERATION of the numerous rôles played by that large group of substances known (rather loosely) as plastics indicates that a plastic may perform one of two general functions. It may either replace (or displace) some other substance which it resembles closely in properties. In this case it comes truly under the heading of a substitute, and unfortunately there then tends to attach to it some of the opprobrium typified to-day by the term *ersatz* in spite of the fact that the properties which enable it to act as a substitute may well be such as to make it actually superior to the material for which it acts as *locum tenens*. Alternatively, it may possess properties enabling it to be utilised for purposes to which no other material was previously entirely suitable. Two recent papers illustrate strikingly these two aspects of plastic usage; and they should serve to indicate a number of lines of thought to chemists who have otherwise not much contact with the plastics industry. ("*Perspex*" *in Laboratory Work*, J. A. Radley, *Anal.*, 1942, *67*, 288; *Methyl Methacrylate as Imbedding Agent*, H. F. Halenz and L. W. Botimer, *J. Chem. Educ.*, 1942, *19*, 313).

The colourless transparent liquid, methyl methacrylate, $CH_2.C(:CH_2).COOCH_3$, polymerises readily, particularly with heat or in the presence of certain substances such as benzoyl peroxide, to a clear solid resin with the probable structure:



The methyl methacrylate polymer, known best in this country under the trade name "Perspex," and manufactured by I.C.I. (Plastics), Ltd., is, as its name implies, a material which is an obvious substitute for glass. Its optical transparency is very marked, and its properties in the ultra-violet and infra-red regions add to the value of the material. Consequently, it suggests itself as a suitable medium for the replacement of glass in many fields where the scientist relies on optical measurements. Colour filters and lantern slides are the most natural uses, particularly since "Perspex" can be dyed to any shade. Since it is easily engraved, it can be used to prepare ruled sheets of various design for use in the photography of documents in ways demanded by modern forensic practice. Optical cells for such operations as spectrophotometry and fluorescence microscopy are readily constructed from the plastic; while marked resistance to most inorganic solutions, and to many organic solvents, encourages this departure. Lenses and prisms may be made from "Perspex."

Since the sheets of "Perspex" may be softened at 120° C., however, the material may be put to uses which glass cannot cover. If it is softened by heat, it can be used for taking very detailed impressions of coins and other similar objects. Such impressions may be retained indefinitely; or, when finished with, they may be destroyed by the simple process of reheating till the plastic is once more soft, when it may be used again for further records.

If the unpolymerised resin is available, its transparency makes it very valuable for the preservation of actual specimens of widely varying natures. If partial polymerisation of the liquid is carried out, the plastic may be poured into a mould, and on continued heating in an oven a solid block of transparent resin is produced. If, then, a specimen, such as a coin, a leaf, a beetle, etc., is placed on this block, and further partially polymerised resin added, the final result after reheating is a solid block completely enclosing the specimen, and showing no visible join. The successive layers of plastic join together so smoothly that no strain is visible, even under polarised light. Although the uses of this technique which have been suggested are mainly archæological and biological, it is probable that chemists might find it of value on occasion, to preserve specimens from damage. It would be of interest, for example, to investigate the possibility of preserving in this way samples of highly deliquescent crystals, since it is quite likely that the high refractive index of the resin (about 1.49) would permit many crystals to remain quite clearly defined.

It is an unfortunate result of the times that supplies of the resin are at present rigidly limited by the Plastics Controller. But that need not prevent chemists from considering whether they might not be able to use a substance of such diverse applications when it becomes once more available in quantity.

U.S. Government officials, it is stated, are considering the question of paying premium prices for a larger proportion of monthly production of copper, lead and spelter. The plan aims at providing incentive for increased production by revising downward the quotas set jointly by the War Production Board and the Office of Price Administration.

LETTER TO THE EDITOR

Radium in Britain

SIR,—In reading the leading article "Radium" which appeared in your journal on October 24, one would gain the impression that little or no commercial radium activities exist in this country, but this is far from the true state of affairs.

Radium as yielded by the extraction plant is not in the form in which it can be applied to medical, industrial or scientific use. For medical purposes it must be subdivided with great accuracy, loaded into a wide variety of containers ranging from the small needle containing ½ mg. to the "bomb" containing several grammes, sealed, tested for leakage, and finally measured before being handed over for clinical use.

Its use as a luminising agent and as a γ-ray source for radiography are perhaps the most important industrial applications. Large quantities are consumed in the complicated process of making the radium luminous compounds applied to aircraft instruments, gun sights, etc., and there is a growing demand for the γ-ray sources used for radiographic inspection of castings, welded seams, valves, and similar fittings. These sources take the form of capsules, similar to the containers used for medical purposes, and they require the same facilities for filling, sealing and measuring.

The quantities of radium necessary for scientific purposes are by no means insignificant. The neutron sources alone, in which a combination of radium and beryllium is employed, involve the use of large amounts of radium, and they are an example of the highest degree of skill in loading technique, container design and construction.

Ample facilities have existed in this country for many years to carry out all these delicate and dangerous operations. To achieve this end a great deal of patient research has been necessary in view of the peculiar nature of the processes and the lack of precedent. This has made possible the distribution of radium in suitable containers not only to meet requirements in England, but it has also been despatched from this country to America, Africa, India, Australia and other parts of the globe. This is no small tribute to the excellence of the technique employed in carrying out the work.

It should not be assumed from the above that refining and other developments have been entirely overlooked. After the war it may be permitted to disclose what has been happening and I am confident that the radium industry in this country will emerge greatly strengthened in every respect. I feel that the information given above somewhat alters the picture painted in your article, and I should therefore be grateful if you could set aside space for the publication of these facts and opinions.—Yours faithfully,

E. G. PICKERING,
Manager, Radium Dept.,
JOHNSON, MATTHEY & CO., LIMITED.
London, E.C.1.
November 24.

Scientists' Council

The Institute of Chemistry in Action

A JOINT Council of Professional Scientists, representing over 10,000 qualified scientists, has been set up under the chairmanship of Sir Robert Pickard, F.R.S., by the Institutes of Chemistry and Physics, in association with representatives of professional botanists, geologists, mathematicians and zoologists. The Council has been established to voice the collective opinion of qualified scientists on matters of public interest, to provide a liaison between professional organisations of scientists for co-ordinated action in matters of common interest, and in particular to concern itself with: (i) the utilisation of scientists to the best advantage in the service of the community; (ii) the education, training, supply and employment of scientists; (iii) the better understanding of the place of scientists in the community; (iv) the maintenance of adequate qualifications and ethical standards among professional scientists; (v) the supply of information and advice to public and other bodies on matters affecting scientists. The members of the Council are as follows:

Representing the Institute of Chemistry: Dr. J. J. Fox, C.B., O.B.E. (President, Institute of Chemistry); Professor Alexander Findlay; Dr. G. Roche Lynch, O.B.E.; Sir Robert Pickard, Kt., F.R.S.; Dr. H. A. Tempany, C.M.G., C.B.E.; Mr. R. B. Pilcher, (Registrar and Secretary, Institute of Chemistry).

Representing the Institute of Physics: Professor Sir Lawrence Bragg, Kt., O.B.E., F.R.S. (President, Institute of Physics); Professor J. A. Crowther; Mr. E. R. Davies; Dr. B. A. Keen, F.R.S; Dr. H. Lowery; Dr. H. R. Lang (Secretary, Institute of Physics).

Botanists are represented by Professor W. Brown, F.R.S., zoologists by Professor D. Keilin, F.R.S., mathematicians by Professor S. Chapman, F.R.S., and geologists by Professor H. H. Read, F.R.S.

The Joint Council has been established for the period of the national emergency, but it may form the nucleus of some more permanent organisation to facilitate the close collaboration between professional men and women practising in all branches of science. Communications to the Council should be addressed to Dr. H. R. Lang, honorary secretary, Joint Council of Professional Scientists, c/o The Institute of Physics, The University, Reading, Berks.

Personal Notes

MR. G. W. THOMAS, of I.C.I. (Plastics), Ltd., has been appointed Deputy Controller of Plastics in place of MR. C. H. GLASSEY, who has resigned for reasons of health.

DR. HARRY BARRON, Ph.D., B.Sc., A.I.R.I., who is well known for his work on the chemistry of rubber and of plastics, has been elected a Fellow of the Institute of Chemistry.

DR. J. L. SIMONSEN, D.Sc., F.R.S., F.I.C., who has been Professor of Chemistry at the University College of North Wales, Bangor, since 1930, has been appointed Director of Colonial Products Research under the Colonial Office.

DR. D. P. EVANS, A.I.C., has been appointed honorary secretary and hon. treasurer of the Cardiff Section of the Institute of Chemistry, in succession to Dr. Dippy, whose selection as head of the Chemistry Department of Wigan Technical College was announced last month.

PROFESSOR J. E. LENNARD-JONES, Plummer Professor of Theoretical Chemistry at Cambridge University, has been appointed Chief Superintendent of Armament Research in the Ministry of Supply, and MR. F. E SMITH, of I.C.I., Ltd., has been given the post of Chief Engineer and Superintendent, Armament Design.

MR. W. J. DRISCOLL, B.Sc., of the B.C.I.R.A., has been elected chairman of the Fuel Economy and Efficiency Committee set up by the Council of Ironfounding Associations to act in conjunction with the Ministry of Fuel and Power. MR. J. BOLTON, of the Institute of British Foundrymen, is secretary.

DR. DAVID SPENCE, of Salinas, California, recently appointed chief technical adviser to the Committee on Rubber under W.P.B., Washington, is a native of Aberdeenshire, and studied chemistry at the Royal Technical College, Glasgow. After a period in Germany he worked on chemical research at Liverpool University, while in America he devoted himself to rubber chemistry, becoming one of the leading authorities on guayule rubber.

Obituary

MR JOHN DUXBURY, who died at Mossley Hill, Lancs., on November 12 in his 90th year, had spent all his working life in the service of William Gossage & Sons, Ltd., chemical manufacturers, Widnes. He retired as a departmental manager 20 years ago, but his services were retained in a consultative capacity.

New Control Orders

Iron and Steel Prices

The Minister of Supply has issued a new Order controlling Iron and Steel, which amends certain of the prices established under earlier Orders and includes an increase in price of 6 per cent. for general steel castings. Otherwise the changes are of a minor character. The Order also establishes controlled maximum prices for certain iron and steel and allied materials, hitherto not covered, notably special quality steels, cemented carbide tool tips, medium plates rolled in a sheet mill, pit props, and ferromolybdenum grinding powder. The Order —the Control of Iron and Steel (No. 26) Order, 1942 (S. R. & O. 1942, No. 2375), came into force on November 24.

Fuel Burning Machinery

A general licence (S. R. & O. 1942, No. 2360) under the Machinery, Plant and Appliances (Control) Order, 1942, has been made by the Board of Trade authorising the acquisition of controlled material for the conversion of fuel-burning machinery and plant adapted for the using of any grade of petroleum oil or creosote, to the use of creosote pitch, provided that due authority has been granted by the Petroleum Board.

Fortified Flour

Estimation of Added Calcium Carbonate

METHODS for the estimation of added calcium carbonate in "national" flour were described by Messrs. E. N. Greer, J. D. Mounfield, and W. J. S. Pringle at a recent meeting of the Society of Public Analysts. The three methods studied were as follows: (a) The sample is incinerated and calcium is determined in the ash by precipitation as oxalate and titration with permanganate; a blank estimation should be made on a sample of the same flour without addition of calcium carbonate. (b) The sample is treated with excess of standard hydrochloric acid and the excess titrated back with alkali; with this method also a blank estimation is necessary. (c) The carbon dioxide liberated by excess of hydrochloric acid is absorbed and weighed.

If a control sample of the unfortified flour is available the oxalate method is the most accurate; without a control sample the error may be as much as 20 per cent. Method (b) also requires a control sample and when the amount of calcium carbonate is about 7 oz. per sack the method is accurate to 3-4 per cent. Method (c) is accurate to within about 3 per cent. even in the absence of a control, and this method is therefore the most useful of the three.

Prices of British Chemical Products

MARKET conditions during the past week have been satisfactory and a fair inquiry has been reported for the whole range of industrial chemicals. Among the soda products, offers of caustic soda and bicarbonate of soda are finding a ready outlet, while supplies of chlorate of soda and yellow prussiate of soda continue scarce. A good inquiry is reported for acetate of soda, Glauber salts and salt cake. Strong price conditions continue for potash chemicals, with offers of yellow prussiate of potash scarce, and in other directions a steady inquiry is in circulation. In the coal-tar products market there is a good demand for pitch, carbolic acid, and creosote oil, while the benzols and toluols are a firm market. Activity in xylols is restricted, pending the issue of the control order.

MANCHESTER.—Traders on the Manchester chemical market during the past week have been handling a moderate volume of fresh inquiry, mainly on home consumption account, and there has been little ground for complaint regarding the rate at which old contracts are being drawn against, more particularly in caustic soda and the other leading soda products. The demand for the heavy acids and for the ammonium and magnesium compounds has also been on steady lines. The by-products maintain a generally firm front, most of them at controlled levels, and a steady movement into consumption is reported.

GLASGOW.—Business in the Scottish heavy chemical trade has been rather quieter during the past week for home business. Export trade is still rather limited. Prices remain very firm with a tendency to rise.

General Chemicals

Acetic Acid.—Maximum prices per ton: 80% technical, 1 ton £39 10s.; 10 cwt./1 ton, £40 10s., 4/10 cwt., £41 10s.; 80% pure, 1 ton, £41 10s.; 10 cwt./1 ton, £42 10s.; 4/10 cwt., £43 10s.; commercial glacial, 1 ton, £49; 10 cwt./1 ton, £50; 4/10 cwt., £51; delivered buyers' premises in returnable barrels, £4 10s. per ton extra if packed and delivered in glass.

Acetone.—Maximum prices per ton, 50 tons and over, £65; 10/50 tons, £65 10s.; 5/10 tons, £66; 1/5 tons, £66 10s.; single drums, £67 10s.; delivered buyers' premises in returnable drums or other containers having a capacity of not less than 45 gallons each. For delivery in non-returnable containers of 40/50 gallons, the maximum prices are £3 per ton higher. Deliveries of less than 10 gallons free from price control.

Alum.—Loose lump, £14 10s. per ton, f.o.b.

Aluminium Sulphate.—£10 15s. to £11 5s. per ton d/d.

Ammonia Anhydrous.—1s. 9d. to 2s. 3d. per lb.

Ammonium Carbonate.—£37 10s. per ton d/d in 5 cwt. casks.

Ammonium Chloride.—Grey galvanising £22 10s. per ton, in casks, ex wharf. Fine white 98%, £19 10s. per ton. See also Salammoniac.

Antimony Oxide.—£111 to £117 per ton.

Arsenic.—For 1-ton lots, £41 to £46 per ton, according to quality, ex store; for 20-ton lots; £35 to £40 per ton d/d. Intermediate prices for intervening quantities.

Barium Chloride.—98/100%, prime white crystals, £16 10s. to £19 10s. per ton, bag packing, ex works; imported material would be dearer.

Bleaching Powder.—Spot, 35/37%, £11 to £11 10s. per ton in casks, special terms for contract.

Borax, Commercial.—Granulated, £31 10s.; crystals, £32 10s.; powdered, £33; extra fine powder, £34; B.P. crystals £40 10s.; powdered, £41; extra fine, £42 per ton for ton-lots, in free 1-cwt. bags, carriage paid in Great Britain. Borax Glass, lump, £83; powder, £84 per ton in tin-lined cases for home trade only, packages free, carriage paid.

Boric Acid.—Commercial, granulated, £52 15s.; crystals, £53 15s.; powdered, £54 15s.; extra fine powder, £56 15s.; B.P. crystals, £61 15s.; powdered, £62 15s.; extra fine powdered, £64 15s. per ton for ton lots in free 1-cwt. bags, carriage paid in Great Britain.

Calcium Bisulphite.—£6 10s. to £7 10s. per ton f.o.r. London.

Calcium Chloride.—70/72% solid, £5 15s. per ton, ex store.

Charcoal, Lump.—£10 10s. to £14 per ton, ex wharf. Granulated, supplies scarce.

Chlorine, Liquid.—£23 per ton, d/d in 16/17 cwt. drums (3-drum lots).

Chrometan.—Crystals, 5½d. per lb.

Chromic Acid.—1s. 5d. per lb., less 2½%, d/d U.K.

Citric Acid.—Controlled prices per lb., d/d buyers' premises. For 5 cwt. or over, anhydrous, 1s. 6¾d., other, 1s. 5d.; 1 to 5 cwt., anhydrous, 1s. 9d., other, 1s. 7d. Higher prices for smaller quantities.

Copper Oxide.—Black, £95 per ton.

Copper Sulphate.—£31 5s. per ton, f.o.b., less 2 per cent. in 2 cwt. bags.

Cream of Tartar.—100%, £18 12s. per cwt., less 2½%, d/d in sellers' returnable casks.

Formaldehyde.—£24 10s. to £26 per ton in casks, according to quantity, d/d. MANCHESTER: 40%, £24 10s. to £26 10s. per ton in casks, according to quantity, d/d.

Formic Acid.—85%, £47 per ton for ton lots, carriage paid; smaller parcels quoted up to 50s. per cwt., ex store.

Glycerine.—Chemically pure, double distilled 1260 s.g., in tins, £4 to £5 per cwt., according to quantity; in drums, £3 14s. 6d. Refined pale straw industrial, 5s. per cwt. less than chemically pure.

Hexamine.—Technical grade for commercial purposes, about 1s. 4d. per lb.; free-running crystals are quoted at 2s. 1d. to 2s. 3d. per lb.; carriage paid for bulk lots.

Hydrochloric Acid.—Spot, 6s. 5½d. to 8s. 11d. per carboy d/d according to purity, strength and locality.

Hydrofluoric Acid.—59/60%, about 1s. to 1s. 2d. per lb.

Iodine.—Resublimed B.P., 10s. 4d. to 14s. 6d. per lb., according to quantity.

Lactic Acid.—Dark tech., 50% by vol., £40 10s. per ton. Not less than one ton lots ex works; barrels returnable, carriage paid.

Lead Acetate.—White, 51s. to 54s. per cwt. MANCHESTER: £51 to £54 per ton.

Lead Nitrate.—About £47 per ton d/d in casks.

Lead, Red.—English, 5/10 cwt., £45 per ton; 10 cwt. to 1 ton, £44 15s.; 1/2 tons, £44 10s.; 2/5 tons, £44; 5/20 tons, £43 10s.; 20/100 tons, £43; over 100 tons, £42 10s. per ton, less 2½%, carriage paid, non-setting red lead, 10s. per ton dearer in each case.

Lead, White.—Dry English, less than 5 tons, £55 10s.; 5/15 tons, £51 10s.; 15/25 tons, £51; 25/50 tons, £50 10s.; 50/200 tons, £50 per ton, less 5 per cent. carriage paid; Continental material, £1 per ton cheaper. Ground in oil, English, 1/5 cwt., £67; 5/10 cwt., £66; 10 cwt. to 1 ton, £65 10s.; 1/2 tons, £64; 2/5 tons, £63; 5/10 tons, £61; 10/15 tons, £60; 15/25 tons, £59; 50/100 tons, £58 10s. per ton, less 5% carriage paid.

Litharge.—1 to 2 tons, £44 10s. per ton.

Lithium Carbonate.—7s. 9d. per lb. net.

Magnesite.—Calcined, in bags, ex works, £18 15s. to £22 15s. per ton.

Magnesium Chloride.—Solid (ex wharf), £14 to £18 per ton. MANCHESTER: £14 to £16 per ton.

Magnesium Sulphate.—Commercial, £12 to £14 per ton, according to quality, ex works.

Mercury Products.—Controlled price for 1 cwt. quantities: Bichloride powder, 15s. 8d.; bichloride lump, 16s. 3d.; ammon. chloride powder, 17s. 10d., ammon, chloride lump, 17s. 8d.; mercurous chloride, 18s. 7d.; mercury oxide, red cryst, 20s. 9d.; red levig., 20s. 3d.; red tech., 19s. 11d.; yellow levig., 20s. 2d.; yellow tech., 19s. 7d.; sulphide, red, 17s. 9d.

Methylated Spirit.—Industrial 66° O.P. 100 gals., 2s. 4d. per gal.; pyridinised 64° O.P. 100 gals., 2s. 5d. per gal.

Nitric Acid.—£24 to £26 per ton, ex works.

Oxalic Acid.—£60 to £65 per ton for ton lots, carriage paid, in 5-cwt. casks; smaller parcels would be dearer; deliveries slow.

Paraffin Wax.—Nominal.

Potash, Caustic.—Basic price for 50-100 ton lots. Solid, 88/92%, commercial grade, £53 7s. 6d. per ton, c.i.f. U.K. port, duty paid. Broken, £5 extra; flake, £7 10s. extra; powder, £10 extra per ton. Ex store, £3 10s. supplement. Liquid, d/d, £32, in lots of 1 ton.

Potassium Bichromate.—Crystals and granular, 7½d. per lb.; ground, 8¼d. per lb., for not less than 6 cwt.; 1-cwt. lots, ½d. per lb. extra.

Potassium Carbonate.—Basic prices for 50 to 100 ton lots; calcined, 98/100%, £52 10s. per ton, c.i.f. U.K. port. Ex warehouse, £55 5s. per ton.

Potassium Chlorate.—Imported powder and crystals, nominal.

Potassium Iodide.—B.P., 8s. 8d. to 12s. per lb., according to quantity.

Potassium Nitrate.—Small granular crystals, £40 to £45 per ton ex store, according to quantity.

Potassium Permanganate.—B.P., 1s. 10d. per lb. for 1 cwt. lots; for 3 cwt. and upwards, 1s. 9½d. per lb.: technical, £7 18s. 6d. to £8 10s. 6d. per cwt., according to quantity d/d.

Potassium Prussiate.—Yellow, 5 cwt. to 7 cwt., casks, 1s. 6d. per lb., d/d; supplies scarce.

Salammoniac.—First lump, spot, £48 per ton; dog-tooth crystals, £50 per ton; medium, £48 10s. per ton; fine white crystals, £19 10s. per ton, in casks, ex store.

Soda, Caustic. — Solid 76/77%; spot, £16 7s. 6d. per ton d/d station.

Sodium Acetate.—£41 per ton, ex wharf.

Sodium Bicarbonate.—Refined, spot, £11 per ton, in bags.

Sodium Bichromate.—Crystals, cake and powder, 5½d. per lb., anhydrous, 6d. per lb., net d/d U.K.

Sodium Bisulphite Powder.—60/62%, £19 10s. per ton d/d in 2-ton lots for home trade.

Sodium Carbonate Monohydrate.—£21 per ton d/d in minimum ton lots in 2 cwt. free bags.

Sodium Chlorate.—£36 to £45 per ton, d/d, according to quantity.

Sodium Hyposulphite.—Pea crystals, £20 per ton for 2-ton lots; commercial, £15 per ton; photographic, £22 per ton.

Sodium Iodide.—B.P., for not less than 28 lb., 9s. 6d. per lb., for not less than 7 lb., 13s. 1d. per lb.

Sodium Metasilicate.—£16 per ton, d/d U.K. in 1-ton lots.

Sodium Nitrate.—Refined, £15 5s. per ton for 6-ton lots d/d.

Sodium Nitrite.—£21 to £23 per ton for ton lots.

Sodium Percarbonate.—21½% available oxygen, £7 per cwt.

Sodium Phosphate.—Di-sodium, £20 to £25 per ton d/d for ton lots. Tri-sodium, £26 to £30 per ton d/d for ton lots.

Sodium Prussiate.—8½d. to 9½d. per lb. ex store.

Sodium Silicate.—£9 10s. to £10 12s. 6d. per ton, for 4-ton lots.

Sodium Sulphate (Glauber Salts).—£4 10s. ton d/d.

Sodium Sulphate (Salt Cake).—Unground. Spot £4 11s. per ton d/d station in bulk. MANCHESTER: £4 15s. per ton d/d station.

Sodium Sulphide. — Solid, 60/62%, spot, £17 15s. per ton, d/d, in drums; crystals, 30/32%, £12 7s. 6d. per ton, d/d, in casks.

Sodium Sulphite.—Anhydrous, £29 10s. per ton; pea crystals, spot. £20 10s. per ton d/d station in kegs; commercial, £12 to £14 per ton d/d station in bags.

Sulphur.—Per ton, for quantities of not less than 4 tons: unground, unsieved, and ungraded, £14 10s., ex store; ground, but not sieved, £15 5s.; ground and sieved, £16 to £17 10s., according to mesh. Controlled prices.

Sulphuric Acid.—168° Tw., £6 10s. to £7 10s. per ton; 140° Tw., arsenic-free, £4 11s. per ton; 140° Tw., arsenious, £4 3s. 6d. per ton. Quotations naked at sellers' works.

Tartaric Acid.—4s. 4d. per lb., less 5%, carriage paid for lots of 5 cwt. and upwards. MANCHESTER: 4s. 4d. per lb.

Tin Oxide.—Snow white, 305s.-315s. per cwt.

Zinc Oxide.—Maximum prices: White seal, £30 17s. 6d. per ton; red seal, £28 7s. 6d. d/d; green seal, £29 17s. 6d. d/d.

Zinc Sulphate.—Tech., £20-£21 per ton, carriage paid, casks free.

Rubber Chemicals

Antimony Sulphide.—Golden, 1s. 2d. to 2s. 1½d. per lb. Crimson, 2s. 2d. to 2s. 6d. per lb.

Arsenic Sulphide.—Yellow, 1s. 9d. per lb.

Barytes.—Best white bleached, £8 3s. 6d. per ton.

Cadmium Sulphide.—6s. to 6s. 6d. per lb.

Carbon Black.—6d. to 8d. per lb., according to packing.

Carbon Bisulphide.—£34 per ton, according to quality, in free returnable drums.

Carbon Tetrachloride.—£46 to £49 per ton.

Chromium Oxide.—Green, 2s. per lb.

India-rubber Substitutes. White, 6 3/16d. to 10½d. per lb.; dark, 6 3/16d. to 6 15/16d. per lb.

Lithopone.—30%, £25 per ton; 60%, £31 to £32 per ton. Imported material would be dearer.

Mineral Black.—£7 10s. to £10 per ton.

Mineral Rubber, "Rupron."—£20 per ton.

Sulphur Chloride.—7d. per lb.

Vegetable Lamp Black.—£49 per ton.

Vermilion.—Pale or deep, 15s. 6d. per lb. for 7-lb. lots.
Plus 5% War Charge.

Nitrogen Fertilisers

Ammonium Phosphate Fertilisers.—Type B, See Concentrated Fertilisers.

Ammonium Sulphate.—Per ton in 6-ton lots, d/d farmer's nearest station, August, £9 10s.; increased charge of 1s. 6d. per month up to March, 1943.

Calcium Cyanamide.—Nominal; supplies very scanty.

Concentrated Fertilisers.—Per ton in 6-ton lots d/d farmer's nearest station, in August: I.C.I. Type, "Special III." £14 9s. 6d.; Type "B." £14 1s. 3d.; Type "C," £17 19s. Increased charge of 1s. 6d. per month up to March, 1943.

"Nitro Chalk."—£9 14s. per ton in 6-ton lots, d/d farmer's nearest station.

Sodium Nitrate.—Chilean super-refined for 6-ton lots d/d nearest station, £15 5s. per ton; granulated, over 98%, £14 10s. per ton. Surcharges for smaller quantities unless collected at warehouse or depots.

Coal Tar Products

Benzol.—Crude, 60's, 1s. 10d.; pure 2s. 6d., per gal., ex works.

Carbolic Acid.—Crystals, 10d. to 11d. per lb. Crude, 60's, 4s. 3d. to 4s. 6d., according to specification. MANCHESTER: Crystals, 9¾d. to 11½d. per lb., d/d; crude, 4s. to 4s. 6d., naked, at works.

Cresote.—Home trade, 6½d. per gal., f.o.r., maker's works; exports, 6d. to 6½d. per gal., according to grade. MANCHESTER: 6½d. to 9d. per gal.

Cresylic Acid.—Pale, 97%, 3s. 6d. per gal.; 95%, 4s. 2d.; 99.5/100%, 4s. 6d. MANCHESTER: Pale, 99/100%, 4s. 6d. per gal.

Naphtha.—Solvent, 90/160°, 2s. 2d. to 2s. 6d per gal.; heavy, 90/190°, 1s. 10d., naked works. MANCHESTER: 90/160°, 1d. to 2s. 4d. per gal.

Naphthalene.—Crude, in 4-ton lots, in sellers' bags, £5 9s. to £8 9s. per ton, according to m.p. In sellers' bags, 2s. ton lots; pressed, £10 5s. per ton; purified crystals, £19 to £35 per ton. Controlled prices.

Pitch, medium, soft, 45s. to 55s. per ton, MANCHESTER: 47s. 6d. per ton naked.

Pyridine, 90/140°, 18s. per gal.; 90/160°, 14s. MANCHESTER: 14s. to 18s. 6d.

Toluol.—Pure, 2s. 5d. nominal; 90's, 1s. 10d. per gal. MANCHESTER: Pure, 2s. 5d. per gal. naked.

Xylol.—Commercial, 3s. 1d. to 3s. 5½d. per gal.; pure, 3s. 2½d. to 3s. 7d. MANCHESTER: 2s. 8d. to 3s. 1d.

Wood Distillation Products

Calcium Acetate.—Brown, £21 per ton; grey, £24. MANCHESTER: Grey, £25 per ton.

Methyl Acetone.—40/50%, £56 per ton.

Wood Creosote.—Unrefined, about 2s. per gal., according to boiling range.

Wood Naphtha, Miscible.—4s. 6d. to 5s. 6d. per gal.; solvent, 5s. 6d. per gal.

Wood Tar.—£5 per ton.

Intermediates and Dyes (Prices Nominal)

m-**Cresol** 98/100%.—Nominal.

o-**Cresol** 30/31° C.—Nominal.

p-**Cresol** 34/35° C.—Nominal.

Dichloraniline.—2s. 8½d. per lb.

Dinitrobenzene.—8½d. per lb.

Dinitrotoluene.—48/50° C., 9½d. per lb; 66/68° C., 1s.

p-**Nitraniline.**—2s. 5d. per lb.

Nitrobenzene.—Spot, 5½d. per lb. in 90-gal. drums, drums extra, 1-ton lots d/d buyer's works.

Nitronaphthalene.—1s. 2d. per lb.; P.G., 1s. 0½d. per lb.

o-**Toluidine.**—1s. per lb., in 8/10 cwt. drums, drums extra.

p-**Toluidine.**—2s. 2d. per lb., in casks.

m-**Xylidine Acetate.**—4s. 5d. per lb., 100%.

Latest Oil Prices

LONDON.—November 25.—For the period ending January 2, per ton, net, naked, ex mill, works or refinery, and subject to additional charges according to package and location of supplies: LINSEED OIL, crude, £46 10s. RAPESEED OIL, crude, £48 5s. COTTONSEED OIL, crude, £39 12s. 6d.; washed, £42 15s.; refined edible, £48; refined, deodorised, £49. COCONUT OIL, crude, £36 12s. 6d.; refined deodorised, £40. PALM KERNEL OIL, crude, £36; refined deodorised, £40; refined hardened deodorised, £44. PALM OIL, refined deodorised, £46; refined hardened deodorised, £49. GROUNDNUT OIL, crude, £44; neutralised and bleached, £48; refined hardened deodorised, £53 to £54. WHALE OIL, crude hardened, 42 deg., £39; refined hardened, 42 deg., £42. ACID OILS—Groundnut, £27 10s.; soya, £25 10s.; coconut and palm-kernel, £31. ROSIN, 26s. 6d. to 33s. per cwt., ex wharf, according to grade. TURPENTINE, American, 87s. per cwt. in drums or barrels, as imported (controlled price).

General News

The new address of the British Cast Iron Research Association is: Alvechurch, Birmingham. Tel.: Redditch 716 (3 lines).

The 25th annual general meeting of the British Association of Chemists is being held to-day (Saturday, November 28) at 3 p.m., in the Adelphi Hotel, Liverpool.

The quota restriction on the import of superphosphates, ground mineral phosphates, and compound manures into Eire has been suspended during the period November 1, 1942, to June 30, 1943.

The twenty-fifth Streatfield Memorial Lecture of the Institute of Chemistry, was given on November 27 by Mr. R. G. Pelly, who took as his subject "Some Notes on Water Treatment."

A seam of best steam coal, with an estimated yield of 156,000 tons, has been discovered at Awsworth, near Nottingham. It is expected that the seam, which is just below the surface, may provide work for 200 men.

Nearly 400 new names are included in the Trading with the Enemy (Specified Persons) (Amendment) (No. 18) Order, 1942 (S.R. & O. 1942, No. 2324), which came into operation on November 23. Deletions from the list number 59.

Recent research has encouraged the hope that a drug may eventually be discovered which will destroy the tubercle bacillus in man, according to a statement made in London this week by Sir Arthur MacNalty, former chief medical officer of the Ministry of Health.

Members of the Industrial Catering Association (Southern Area), at their next meeting, to be held at the Holborn Restaurant, next Thursday evening, will hear from Dr. J. C. Drummond, scientific adviser to the Ministry of Food, how best to prepare balanced meals in canteens.

The Waste Paper Recovery Association's exhibition "Design for Economy—Paper in Battledress," which has been so successful at the Savoy Hotel, is to be moved to the Ford Motor Company's showrooms at 88 Regent Street, and will be on show to the public for a short time from December 3.

The Council of the Institute of Chemistry has decided that the award of the Meldola Medal should be suspended until further notice. As this is a war-time measure, the Council has also envisaged the possibility of awarding more than one medal in any year, and that if any such medal be awarded, it should be to a candidate who has been precluded from the consideration of his claims during the war, and may, in consequence, be over the age of 30 years.

From Week to Week

The Secretary of State for Scotland has stated that he hopes to be in a position to publish, at no distant date, the report of the Committee on Hydro-Electric Development in Scotland and to indicate the Government's attitude to its proposals.

The Ministry of Labour announces that it hopes conditions will permit of two alternative two-day holiday breaks for industry during the "festive" season; either December 25 and 26, or January 1 and 2. Dates may be varied to suit local circumstances. The Government expects that workers will not extend the approved holiday period.

Further reductions in the number of colours available for hose—men's, women's, and children's—with a view to economy in fuel, labour and dyestuffs, have resulted from a conference between the National Hosiery Manufacturers' Federation and the Midland Hosiery Dyers' and Finishers' Federation. A summary of the colours resulting from their decisions has been issued by the British Colour Council.

Ashton-under-Lyne Sewage Purification Committee has received a letter from the National Union of General and Municipal Workers alleging that workmen were of opinion that soft soap used in the sewage department had caused dermatitis. In view of the fact that no complaint has been received from any workman, the Union has been asked to supply evidence in support of the allegations.

A tribute to skilled technicians was paid last week in the House of Commons by Mr. Bevin. In reply to a question by Mr. Ellis Smith, he said he was fully aware of the important contribution to our national effort made by skilled technicians in industry. That we had been able to meet the demands for more skilled workers was in great part due to the technicians who, day by day, on the floor of the factory, had imparted their own knowledge and experience to new entrant, especially women.

In every county in Eire the steel containers used for the transport of oxygen, acetylene, nitrous oxide, nitrogen and carbon dioxide, made by Industrial Gases (I.F.S.), Ltd., are now familiar. Oxygen, especially, is produced in Dublin by the liquid air process, and is claimed to be over 99.3 per cent. pure. The gas is compressed into cylinders, made in Great Britain, as there is no plant for their production in Eire, from gas holders, by multi-stage compressors, and to avoid the dangers of oxygen mixed with oil, plungers, lubricated by pure water or a mixture of water and glycerine, are used. The final pressure reached is 120 atmospheres.

Foreign News

The demand for cement in Switzerland is reported to be far in excess of the maximum home production capacity under official fuel regulations, and rationing has been in force for some months.

Ceylon's entire mica output is to be bought by the Ministry of Supply for use by the United Nations, and the Joint Mica Commission has placed its service for the duration at the disposal of the Ministry.

Phosphates from Gafsa and Algerian iron ore were suggested by Mr. Mabane, Parliamentary Secretary to the Ministry of Food, as being two commodities likely to command priority over food products in the allotment of shipping to imports from North Africa.

Nearly eight times as many workers in the U.S. have met accidental deaths as U.S. soldiers have been killed fighting since the beginning of the war—44,500, against 5694—according to figures just published by the National Safety Council, quoted by Reuter.

A complete iron and steel mill is being erected at Monclova, Coahuila, Mexico. This mill will consume 12,000 tons of ore a month and will turn out from 95,000 to 125,000 tons of finished products annually. The first blast furnace is expected to start operations in March next.

Quoting reports from Brazil, *Chem. and Eng. News* states that the Industrias Reunidas F. Matarazzo has started building a new factory in S. Paulo for the production of cellophane and other transparent papers. The plant's capacity will be enough to meet the demands of all South America.

In the first seven months of 1942 electric power production in Canada was more than 17 per cent. above that in the same months of 1941, although those months had established a record. Further large additions to hydro-electric installations are under construction.

A new method of recovering copper by deplating it from iron and steel scrap has been announced by E.I. du Pont de Nemours and Co. in the U.S.A. Virtually 100 per cent. of the copper is recovered "in a form satisfactory for direct use in electroplating important metal parts for military equipment," the report states, adding that "large quantities of strip steel and iron may be made available for re-use."

The use of nickel, except where specifically authorised by the Director General for Operations, has been restricted by W.B.P., Washington, to implements of war and other products certified by the Army-Navy Munitions Board to be essential to the successful prosecution of the war. This tightening of control over nickel is contained in a revision of a previous order which prohibits the use of the metal for many purposes.

Synthetic camphor is now being made at Madras by Deccan Chemicals, Ltd., a public company, with a capital of 500,000 rupees. The company plans to increase the capacity of this plant, which is equipped for the manufacture of acetic and hydrochloric acid as well as for synthetic camphor, while the construction of an additional factory at Bombay is likewise under consideration.

A/B Svenska Aluminium-Kompaniet has received a Government credit of 1,000,000 kronor for the purchase of machinery required for plant extension. Imports of raw material for the company's factories at Maansbo, near Avesta, are interrupted; since last spring, Swedish andalusite has been used for aluminium production in the factory at Kubikenborg, near Sundsvall, and the present output is reported to be about 6000 tons.

Oil from peat is to be produced in Sweden by a new process developed by C. G. Kamme. Dried peat is filled into retorts with a capacity of about 5 tons. It is distilled by means of hot gases which circulate through pipe coils inside the retorts. The gases produced in the retorts are then condensed, and fuel oil, phenol, vaseline, paraffin, and resins are obtained from them by fractional distillation. The residue is a kind of coke which may be used as a domestic fuel.

Three scholarships, each of the annual value of £240 and subject to yearly renewal, and tenable at the Minerals Research Laboratory, University of the Witwatersrand, are to be awarded by the South African National Research Board. Successful candidates, who must possess a university degree in science or engineering, will devote themselves to research in connection with the winning and utilisation of minerals, other than coal.

Plastic piping, made of their thermoplastic resin, "Saran," is announced by the Dow Chemical Co., Midland, Michigan. The piping is unaffected by water and withstands nearly all solvents. It is non-inflammable, possesses high toughness and abrasion resistance, and does not scale or freeze. Heat resistance is said to be excellent up to 80° C. Saran pipe can be welded, bent, sawed, or threaded, and its light weight is a great advantage in transport.

Application for a patent for apparatus to increase industrial alcohol production without use of materials in short supply is being made by the Schenley Distillers Corporation, New York, with the patent dedicated to public use. The company has already offered to other concerns in the distilling industry detailed information about construction methods used in putting the first packed column into operation, and work on the new packed columns is being expedited at the company's plants.

Forthcoming Events

A discussion on "Acid Economy in Plating Processes," opened by Mr. H. Cann, will take place at a meeting of the **Electrodepositors' Technical Society,** to be held at 4 p.m. on **November 30,** at the Northampton Polytechnic, St. John Street, E.C.1.

A meeting of the **Institution of Civil Engineers** will be held at Great George Street, Westminster, S.W.1, at 2 p.m., on **December 1,** when a paper on "Hydro-Electric Development: Some Economic Aspects," will be presented by Messrs. J. K. Hunter, B.Sc., and R. W. Mountain, B.Sc.

The second of the Royal Institution's lectures on "The History of our More Important Foods," by Professor J. C. Drummond, D.Sc., F.I.C., is entitled "Meats." It will take place at the **Royal Institution,** Albemarle Street, W.1, at 3 p.m., on **December 1.** The third, at the same hour and place, on **December 8,** will be about "Dairy Produce."

The next meeting of the Midlands centre of the **Electrodepositors' Technical Society** will be held at the James Watt Memorial Institute, Great Charles Street, Birmingham, at 4.30 p.m., on **December 1,** when a paper on "Lead and Allied Plating of Bearings" will be presented by Mr. O. Wright.

A meeting of the Bristol section of the **Society of Chemical Industry,** jointly with the **Institution of Chemical Engineers,** will be held at the Chemistry Department of the University, Woodlands Road, Bristol, at 5.30 p.m., on **December 3.** Mr. A. H. Manning will speak on "The Production of Nitric Acid."

The Yorkshire Section of the **Society of Chemical Industry** will meet at 2.30 p.m., on **December 5,** at the Hotel Metropole, Leeds, to hear Dr. G. W. Scott Blair speak on "Some Rheological Problems in Industry."

The **Association of Scientific Workers** is holding a Conference on "Scientists of the United Nations and the War Effort," at Gas Industry House, Grosvenor Place, S.W.1, on **December 5** (2.30 p.m.) **and 6** (11 a.m.). Under the chairmanship of Sir Richard Gregory, F.R.S., Sir John Russell, F.R.S., and Professor John Marrack, D.S.O., M.C., prominent scientists from more than 15 countries will speak. Applications for invitations should be sent to the Secretary, Foreign Scientists' Committee, Association of Scientific Workers, Hanover House, 73 High Holborn, W.C.1.

The **Society of Chemical Industry** will meet at the Chemical Society's Rooms, Burlington House, Piccadilly, W.1, at 2.30 p.m., on **December 7.** Dr. W. D. Jones, M.Eng., will give a lecture on "Powder Metallurgy."

A meeting of the **Institute of Fuel** will be held in the Connaught Rooms, Great Queen Street, Kingsway, W.C.2, on **December 10,** at 2.30 p.m., when a paper on "Fuel Economy at Collieries" will be presented by Mr. H. E. Partridge.

At a meeting of the **Pharmaceutical Society of Great Britain,** to be held in the small hall of Friends House, Euston Road, N.W.1, at 2.30 p.m. on **December 10,** Mr. R. Melville, B.Sc., Ph.D., Ph.C., will give a lecture on "Medicinal Indigenous Plants."

The autumn meeting of the **Iron and Steel Institute** will be held at the Royal Victoria Station Hotel, Sheffield, on **December 10.** It will comprise two sessions, the first at 2.30 p.m., when papers concerning rimming steel will be presented, and the second at 5.15 p.m., when there will be a discussion on the second report of the Moulding Materials Sub-Committee.

Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for errors that may occur.

Mortgages and Charges

(Note.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described therein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every company shall, in making its Annual Summary, specify the total amount of debt due from the company in respect of all Mortgages or Charges. The following Mortgages and Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced.)

BRITISH COAL DISTILLATION, LTD., London, S.W. (M., 28/11/42.) November 6, £1950 debentures, part of a series already registered. *£20,000. January 13, 1942.

LANGLEY ALLOYS, LTD., Slough. (M., 28/11/42.) November 7, trust deed dated November 3, 1942, securing £100,000 5½ per cent. first debenture stock, present issue £65,000; general charge. *£70,000 floating charge. £3102 mortgages March 16, 1942.

Satisfactions

BRITISH CELLULOSE LACQUERS, LTD., London, E.C. (M.S., 28/11/42.) Satisfaction October 26, of debentures registered December 8, 1931, to the extent of £5700.

LANGLEY ALLOYS, LTD. (Bucks). (M.S., 28/11/42.) Satisfaction October 30, £672 10s. 8d., registered October 6, 1941.

Bill of Sale

WATSON, FREDERICK LAWRENCE, 30 Midcroft, Ruislip, chemical company's technical advisor. (B.S., 28/11/42.) Dated November 10, 1937, filed November 12, 1937, £40.

Notice of Intended Dividend

POMEROY, DAVID, trading as Osborn Trading Co., 23 Osborn Street, London, E.1, manufacturing wholesale chemist. Last day for receiving proofs—December 1. Trustee, Parkin Stanley Booth, Kimberley House, 14-17 Holborn Viaduct, London, E.C.1.

Company News

Chloride Electrical Storage Co., Ltd., announce an interim dividend of 5 per cent. (same.)

The Imperial Smelting Corporation, Ltd., announces a dividend of 4 per cent. (same) for the year ended June 30.

The Anglo-Iranian Oil Co., Ltd., has resumed interim payments on its ordinary capital after a lapse of two years. The current distribution is 5 per cent.

Explosives and Chemical Products, Ltd., announce a net profit to June 30 of £13,530 (£13,282), and a dividend on the ordinary shares of 16⅔ per cent. (same), while the dividend on the deferred stock is 8.024d. (7.739d.).

New Companies Registered

Cabas Chemical Co., Ltd. (377,245).—Private company. Capital: £100 in 100 shares of £1 each. Manufacturers of and dealers in chemicals, drugs, disinfectants, etc. Directors: S. G. Caulkett; S. F. Dennis; L. G. Smedley. Registered office: 15 Broadway, Leigh-on-Sea, Essex.

Silverwood Chemicals, Ltd. (377,249).—Private company. Capital: £500 in 500 shares of £1 each. Manufacturers of and dealers in lighter fuel, cleansing spirit, chemicals, drugs, disinfectants, etc. Directors: G. J. Winter and C. Unterman. Registered office: 4 Tilney Street, Park Lane, W.1.

Synthetic Resins, Ltd. (377,279).—Private company. Capital: £2500 in 2500 shares of £1 each. Manufacturers and refiners of and dealers in resins, chemicals, oils, coal tar, asphalte, bitumen, paints, varnishes, waxes, gums, raw, waste and reclaimed rubber, etc. Directors: R. T. Sobey; W. Oliver. Registered office: Cheshire Street Works, Mossley, Lancs.

Gramina Pulp Industries, Ltd. (377,105).—Private company. Capital: £6000 in 60,000 ordinary shares shares of 1s. each and 3000 6 per cent. preference shares of £1 each. Producers and sellers of chemical and other pulps manufactured from straw, etc., manufactures of machines and plants for installation in agricultural areas, manufacturers of and dealers in pulp, paper, newsprint, cardboard, etc. Subscribers: Olive Adamthwaite, Wendy Walsh. Registered office: 34 Victoria Street, S.W.1.

Ford Brook Mills, Ltd. (377,149).—Private company. Capital: £4500 in 4000 shares of £1 each and 10,000 shares of 1s. each. Reclaimers of waste rubber and similar materials, manufacturers of and dealers in rubber, gutta percha, balata, plastics and chemicals, etc. Directors: R. O. Brown, R. H. Draper, V. H. Griffiths. Registered office: Essex Wharf, Lea Bridge, E.5.

Chemical and Allied Stocks and Shares

ALTHOUGH there was further moderate contraction of business in Stock Exchange markets, the general undertone remained steady in the absence of selling, and sentiment was aided by the encouraging trend of the war news. Industrial securities continued to hold the greater part of the gains shown earlier in the month, and on balance for the week, movements have not exceeded more than a few pence as regards most shares of companies identified with the chemical and kindred industries.

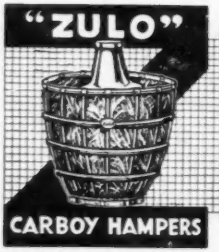
Imperial Chemical at 36s. 6d. were 3d. better on balance, and the 7 per cent. preference were 34s. 10½d., while Lever & Unilever further improved from 33s. to 34s. Moreover, at 83s. the units of the Distillers Co. were well maintained on balance. Borax Consolidated deferred continued firm at 35s., the market having remained hopeful that the dividend on the latter may be kept at 7½ per cent. In other directions, Gas Light & Coke ordinary have maintained their improvement to 17s. 9d. British Aluminium at 49s. 9d. were also unchanged on balance, while British Oxygen at 74s. 6d. held all but a small part of their recent improvement. On the other hand, Imperial Smelting have gone back from 15s. 3d. to 13s. 9d. xd., the market having been hopeful of a small improvement in the dividend, which, however, is being maintained at 4 per cent.

There has been a better tendency in Burt Boulton ordinary shares, which were at the higher level of 17s. 6d. Lawes Chemical were 8s. 9d. "ex" the recently-declared dividend, while British Drug Houses continued to be quoted at their par value of 20s. At 12s. 3d. Goodlass Wall were slightly easier, but in other directions, British Glues & Chemicals 4s. ordinary were at the higher level of 7s. At 17s. 6d. Cellon 5s. ordinary recorded a further small improvement. Barry & Staines also gained a few pence to 36s. 6d., although elsewhere Nairn & Greenwich moved back to 56s. 3d. but, as usual, remained firmly held. Wall Paper Manufacturers deferred units reacted, but subsequently showed a partial rally to 30s. 6d. On the other hand, Lewis Berger further improved to 66s. 3d. in advance of the dividend announcement. Turner &

Newall have been steady around 75s., awaiting declaration of the dividend. Tube Investments were firm at close on 90s.; the full results and accounts are expected to show the maintenance of a very strong financial position. Stewarts & Lloyds were steady at 50s., United Steel 25s. 9d., Dorman Long 22s. 3d., and Allied Ironfounders 38s. 3d. The interim dividend of the last-named company is due shortly.

British Industrial Plastics 2s. shares were better at 4s. 6d., and Erinoid 5s. ordinary transferred around 9s. Associated Cement improved slightly to 56s. 10½d., and British Plaster Board 5s. ordinary were firm at 27s. 6d. Greeff-Chemicals 5s. ordinary were quoted at the better level of 6s. 3d., while Monsanto Chemicals 5½ per cent. preference remained at 22s. 6d., and Morgan Crucible 5½ per cent. first preference were 25s. 7½d. At 17s. 10½d. Amalgamated Metal shares held virtually all their recent improvement, but had a less active appearance. B. Laporte were firm and quoted at 71s. 3d. "middle." In other directions, British Thermostat 5s. shares transferred at 16s. 3d. at one time, Thomas De La Rue at 60s., and Fisons at 41s.

Boots Drug 5s. ordinary were 40s., Sangers 19s. 7½d., and Timothy Whites 23s. 4½d. Steadiness was shown in textile issues, movements not exceeding more than a few pence in most cases. Courtaulds were 44s. 3d., and British Celanese 16s. 3d. Bradford Dyers were 15s. 3d., awaiting the financial results. Dunlop Rubber kept fairly steady around 34s. 9d., the current market view being that there seem to be reasonable possibilities that the dividend will be maintained. In other directions, International Paint shares showed a rise from 103s. 9d. to 105s. British Match were slightly higher at 36s. 9d., as were United Molasses at 30s. 1½d. Moderate fluctuations were shown in "Shell" and other leading oil shares, but at the time of writing there have been small gains on balance. Resumption of interim dividend payments by the Anglo-Iranian company created an excellent impression.



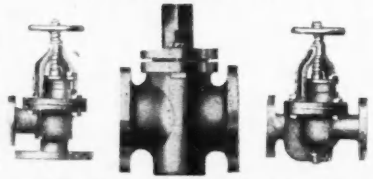
LEIGH & SONS METAL WORKS
Orlando St
BOLTON.

All kinds of Vats and Tanks for Chemical, Dying & Allied Industries.
Vat Builders,
Tel. 976
Robert Airey & Son, Huddersfield

"Fullersite"
A Slate Powder in great demand as the most economical filler for Vulcanite and Moulded Rubber Goods.
H. B. Gould, Port Penhryn, Bangor

Solvent Recovery Plant
Carbon Adsorption System
British Carbon-Norit Union, Ltd.
16, Queen Anne's Gate, S.W.1.

"LION BRAND"
METALS AND ALLOYS
MINERALS AND ORES
RUTILE, ILMENITE, ZIRCON, MONAZITE, MANGANESE, Etc.
BLACKWELL'S
METALLURGICAL WORKS LTD.
GARSTON, LIVERPOOL, 19
ESTABLISHED 1869

FOR VALVES AND COCKS FOR ACIDS IN IMPROVED DESIGNS

HAUGHTON'S METALLIC CO., LTD.
30, ST. MARY-AT-HILL, LONDON, E.C.3.

MINISTRY OF SUPPLY

Have you searched everywhere for NON-FERROUS METALS?

Upon them largely depend the accuracy, deadliness and efficiency of Britain's instruments of war. Practically all of them have to be imported across thousands of miles of dangerous seas, making heavy demands on shipping space.

Make a clean sweep of your unwanted COPPER, ZINC, LEAD, PEWTER, WHITE METAL BRASS AND BRONZE, ALUMINIUM SCRAP

The need for vast and increasing quantities of these metals must be met by a national search for everything made from them which is broken or serving no useful purpose.

WHAT TO SEARCH FOR

Here is a list of some of the important non-ferrous metal articles, parts and equipment likely to be found on your premises. Use it as a guide to your search for everything you can spare.

COPPER — cable, electrical parts and fittings, sheathing, tube, turnings, wire.
ZINC — sheet, cuttings.
LEAD — covered cable, pipe, sheet, solder.
WHITE METAL — anti-friction metal, plumbers' jointings, solder waste.
BRASS — pipe, sheet, tube, turnings.
BRONZE — bearings, bushes, cocks, couplings, crown wheels, junction boxes, unions, valves.
ALUMINIUM SCRAP (and its alloys) — pipe, sheet, castings, tube, turnings.

HOW TO DISPOSE OF IT

1 Sell your non-ferrous scrap to a Merchant.
2 Or hand it in to a Local Authority Depot.
3 SPECIAL COLLECTIONS of amounts over ONE TON may be obtained by getting in touch with the nearest Demolition and Recovery Officer. If you don't know his name, write to The Ministry of Works & Planning, Lambeth Bridge House, London, S.E.1.

NOTE: Under the provisions of the Scrap Metal (No. 2) Order, 1942, if you are in possession of more than 3 tons of Scrap Metal, it is now an offence not to disclose the fact to The Ministry of Works & Planning, Lambeth Bridge House, London, S.E.1.

WANTED! INDUSTRIAL SALVAGE STEWARDS

Salvage is of such great and increasing importance that it should be made the personal responsibility of one particular individual in the various departments of every organisation. Appoint your own Industrial Salvage Stewards. Put them in sole charge of an intensive drive for

STILL MORE PAPER, RUBBER, RAGS, BONES, KITCHEN WASTE—AND METAL

BRITISH ASSOCIATION OF CHEMISTS

Unemployment Insurance, total funds over £28,000
Legal Aid. Income Tax Advice. Appointments Service.

Write for particulars to :—

C. B. WOODLEY, C.B.A., F.C.I.S., General Secretary, B.A.C.
"Empire House," 175, Piccadilly, London, W.1

Phone: REGENT 6611

LACTIC ACID

SULPHONATED OILS
TANNERS' MATERIALS

• • •

BOWMANS (WARRINGTON), LTD.
CHEMICAL MANUFACTURERS

Moss Bank Works : : : Near WIDNES

APPOINTMENTS VACANT

None of the advertisements below relates to a woman between 18 and 31 unless such a woman (a) has living with her a child of hers under the age of 14, or (b) is registered under the Blind Persons Acts, or (c) has a Ministry of Labour permit to allow her to obtain employment by individual effort.

QUALIFIED Chemist required for large firm of cable manufacturers, within the London area. Sound knowledge and experience of plastics as applied to high grade insulating materials essential. Details of training, qualification, experience and salary required to Box No. 2089, THE CHEMICAL AGE, 154 Fleet Street, E.C.4.

WANTED, Metallurgical Chemist with good experience on extraction of Vanadium oxide from ores, etc. Good permanent position as Departmental Manager in small Birmingham works. Chemical initiative to adapt processes essential. Full details in confidence to Box No. 2091, THE CHEMICAL AGE, 154 Fleet Street, E.C.4.

EDUCATIONAL

THE INSTITUTION OF CHEMICAL ENGINEERS.

EXAMINATION, 1943.

APPLICATION forms (returnable 21st December, 1942) and particulars of the Associate-Membership Examination for 1943, together with the Memorandum on "The Training of a Chemical Engineer," may be obtained from the Hon. Registrar, Institution of Chemical Engineers, 56 Victoria Street, Westminster, London, S.W.1.

FOR SALE

'Phone 38 Staines.

OVAL Jacketted Vacuum Oven, 7 ft. by 6 ft. by 3 ft. 6 in.; 40 gallon Copper Jacketted Pan; 30 in. Belt Driven Hydro; Steam Retort, 7 ft. by 2 ft. 9 in.; 50 gallon Jacketted (Gun Metal) Pan.

HARRY H. GARDAM & CO., LTD., STAINES.

EDUCATIONAL

Great Possibilities for

QUALIFIED CHEMICAL ENGINEERS

Key Men in Wartime and Afterwards.

Many of the finest posts in Britain in Wartime are reserved for Chemical Engineers The same will be the case when the war is over. The vast technique and experience now being applied to Chemical Technology for war purposes will then be suitably utilised in reconstruction, and in trade and commerce.

Enrol with the T.I.G.B. for the A.M.I. Chem. E. Examinations in which home-study Students of The T.I.G.B. have gained :—

TWO "MACNAB" PRIZES.

Write to-day for "The Engineer's Guide to Success"—free, containing the world's widest choice of Engineering Courses—over 200—the Department of Chemical Technology including Chemical Engineering Processes, Plant Construction, Works Design and Operation, and Organisation and Management—and which alone gives the Regulations for A.M.I.Chem.E., A.M.I. Mech.E., A.M.I.E.E. C. & G. B.Sc., etc.

THE TECHNOLOGICAL INSTITUTE OF GREAT BRITAIN,
219 Temple Bar House, London. E.C.4.

FOR SALE

FOR SALE IN BRISTOL

LEAD LINED OPEN TANK, 10 ft. 0 in. by 10 ft. 0 in. by 12 ft. 6 in. deep at sides and 13 ft. 6 in. deep in centre, sides being carried down to full 13 ft. 6 in. deep; 5/16 in. plate; each side having three 6 in. by 5 in. R.S.J. strengthening beams each 15 ft. 6 in. long riveted vertically to sides; stay bolts across top; lined ¼ in. thick lead stayed to sides of Tank; also fitted with approx. 70 ft. of 2 in. dia. lead coil; capacity approx. 8,000 gallons.

GEORGE COHEN, SONS & CO., LTD., STANNINGLEY, near LEEDS.

CHARCOAL, ANIMAL, and VEGETABLE, horticultural, burning, filtering, disinfecting, medicinal, insulating; also lumps ground and granulated; established 1830; contractors to H.M. Government.—THOS. HILL-JONES, LTD., "Invicta" Mills, Bow Common Lane, London, E. Telegrams, "Hill-Jones, Bochurch, London." Telephone: 3285 East.

100 REBUILT Hydro Extractors by all leading makers from 18 in. upwards with countershafts attached and safety covers. Jacketed Steam Pans, various sizes. List on request. Seen at Randalls, Arundel Terrace, Barnes. Telephone: Riverside 2436.

1000 STRONG NEW WATERPROOF APRONS. To-day's value 5s. each. Clearing at 30s. dozen. Also large quantity Filter Cloths, cheap. Wilsons, Springfield Mills, Preston, Lancs Phone 2198.

HYDRAULIC TUBING, 1 in., large quantity, secondhand, new condition, also limited quantities other sizes and fittings. Hydraulic Valves, new, various types against requirements. Thompson & Son (Millwall), Ltd., Cuba Street, Millwall, London, E.14. East 1844.

Calling the North . . . . .

WILL our friends in Stockton note we are nearby? If you put that job in hand NOW, you will save money.

We have the men and gear up there. All we want is your job to get busy on.

Why not sit down NOW and ask us to quote. It won't cost you anything.

ESERIN (STEEPLEJACKS), LTD.,

7 Great Castle Street, W.1.

Langham: 2914.

EX AN OIL REFINERY IN BRISTOL.

MILD STEEL VESSEL, 6 ft. 0 in. dia. by 7 ft. 0 in. deep on straight; ½ in. riveted steel plate; convex top; 2 ft. 0 in. deep conical base, fitted with 3 in. steam coil about 5 ft. 0 in. dia. by 6 rows deep (say total 90 feet); 16 in. dia. manhole with bolted-on cover; 3 in. dia. draw-off at base; tapered cast-iron column 12 in. to 6 in. high, with 6 in. cast-iron plug cock; fitted with sight glasses, pressure gauge, safety valve and thermometer; supporting lugs; capacity 3½ tons; cast-iron bend and connection to:—

CAST IRON TUBULAR CONDENSER, 5 ft. 6 in. long by 1 ft. 8 in. dia., having approx. 250 square feet of cooling surface, with 6 in., 4 in. and 2 in. connections, and cast-iron separator 15 in. dia. by 3 ft. 0 in. deep.

MILD STEEL VACUUM VESSEL, 6 ft. 0 in. dia. by 9 ft. 0 in. deep on straight; ¼ in. riveted steel plate; dished top and conical bottom (11 ft. 0 in. deep overall); 3 in. dia. bottom draw-off; fitted with belt driven vertical agitator through bevel gearing; 16 in. dia. manhole in side, with bolted-on cover; fitted with sight gauge, pressure gauge and thermometer.

MILD STEEL VESSEL, 6 ft. 0 in. dia. by 7 ft. 0 in. deep on straight; about ½ in. riveted steel plate; dished top and bottom; manhole with bolted-on cover in side; 3 in. dia. bottom draw-off; fitted internally with 3 in. steam coil; sight gauge, pressure gauge and sundry connections, with cast-iron supporting lugs.

MILD STEEL VERTICAL MIXING VESSEL, by Manlove Alliot, 5 ft. 9 in. dia. by 7 ft. 0 in. deep on straight ¼ in. riveted steel plate; dished top and slightly dished bottom; open water-cooling jacket 6 ft. 0 in. up the pan; fitted with vertical agitator driven through bevel gearing, at present arranged for chain drive but horizontal shaft has extension for fast and loose-pulley drive; manhole and cover in top and 3 in. feed connection; 2 in. dia. bottom draw-off.

RIVETED STEEL VERTICAL MIXER, open top; 4 ft. 4 in. dia. by 9 ft. 6 in. deep overall; half spherical bottom; ½ in. plate; paddle-type mixing blades on 3 in. square vertical shaft driven through bevel gearing by fast and loose pulleys 24 in. dia. for 3 in. belt; two cast-iron supporting lugs bolted on.

Horizontal steam-driven, single-cylinder VACUUM PUMP, 8 in. by 12 in. by 12 in. stroke.

GEORGE COHEN, SONS & CO., LTD., WOOD LANE, LONDON, W.12, and STANNINGLEY, near LEEDS.

MACHINERY BARGAINS FOR SALE.

JACKETED Boiling Pans, 4 to 9 tons capacity; 4 roll toothed Crushing Mills; 2½ size and " C " size Disintegrators; Triple Granite Roller Mills; Steele-Cowlishaw Ball Mill; Horizontal steam-driven Vacuum Pump; steel enclosed Vessels, 6 ft. by 7 ft. 6 in. with agitators; five Storage Tanks, 28 ft. long by 7 ft. diameter; 4 Storage Tanks, 9 ft. diameter by 6 ft. deep, totally enclosed; 9 Surface Condensers fitted brass tubes; 10 Vertical Hydraulic Presses, fitted 12 in. rams; 36 in. and 48 in. Manlove motorised Hydro Extractors; 10 Paint Cone Mills, 7 in. to 20 in. diameter; Chain and Bucket Elevators, 11 in. wide, up to 55 ft. high; Worm Conveyors, 9 in. to 14 in. diameter, in various lengths, fitted steel boxes; 12 various Filter Presses. Full list upon application. Inquiries invited.

RICHARD SIZER, LIMITED, CUBER WORKS, HULL.

WANTED

WANTED FOR OWN USE.

ADVERTISER is open to purchase for cash all kinds of Chemical Plant including Mixers, Sifters, Sifter-Mixers, Grinders, Granulators, Tablet Compressing Machines, Filling Machines suitable for Liquids, Powders and Creams, Tube Filling Machines, Homogenisers, Labelling Machines, Wrapping Machines, Emulsifiers, Laboratory Equipment, etc., etc. Send fullest details and prices to Box No. 2092, THE CHEMICAL AGE, 154 Fleet Street, E.C.4.

WANTED, back numbers of THE CHEMICAL AGE as follows:—

1939, January 21st.
1941, March 15th.
1941, October 4th and 25th.
1941, November 1st, 8th, 15th, 22nd and 29th.
1942, January 3rd, 10th and 17th.
1942, February 7th and 21st.

Please reply to THE CHEMICAL AGE, 154 Fleet Street, London, E.C.4.

PATENTS & TRADE MARKS

KING'S PATENT AGENCY, LTD. (B. T. King, A.I.Mech.E., Patent Agent), 146a Queen Victoria Street, London, E.C.4. ADVICE Handbook, and Consultation free. 'Phone: City 6161.

WORKING NOTICE

THE Proprietors of Patent No. 491841 for Improvements in or relating to treatment of superphosphate or fertiliser containing same are desirous of entering into arrangements by way of licence and otherwise on reasonable terms for purpose of exploiting same and ensuring its full development and practical working in this country. All communications should be addressed in the first instance to Haseltine Lake & Co., 28 Southampton Buildings, Chancery Lane, London, W.C.2.

THE Proprietors of the Patent No. 521240 for Depilatory are desirous of entering into arrangements by way of licence and otherwise on reasonable terms for the purpose of exploiting the same and ensuring its full development and practical working in this country. All communications should be addressed in the first instance to Haseltine Lake & Co., 28 Southampton Buildings, Chancery Lane, London, W.C.2.

SERVICING

GRINDING of every description of chemical and other materials for the trade with improved mills.—THOS. HILL-JONES, LTD., " Invicta " Mills, Bow Common Lane, London, E. Telegrams: " Hill-Jones, Bochurch, London." Telephone: 3285 East.

COTTON BAGS
AND
LINERS for SACKS, BARRELS and BOXES
WALTER H. FELTHAM & SON., LTD.
Imperial Works, Tower Bridge Road, London, S.E.1

For Acid or Gritty Liquors
DIAPHRAGM PUMPS
THE PREMIER FILTERPRESS Co., Ltd.
Grosvenor Chambers, Wallington, Surrey.
Tel: Wallington 1635

CARBOY HAMPERS

Safety Crates Packed Carboys

"VULCAN" BRAND

HARRIS (LOSTOCK GRALAM) LTD.

Lostock Gralam Northwich

Telephone:
2217 (2 lines) NORTHWICH

Telegrams:
"VULCAN" LOSTOCK GRALAM

WRITE FOR SAMPLES and TECHNICAL INFORMATION..

PURE CRYSTAL **ALUM**
OF UNVARYING COMPOSITION & UNRIVALLED PURITY

SULPHATE OF ALUMINA
ALL GRADES SUPPLIED

"ALUMINOFERRIC" REGD TRADE MARK
THE CHEAPEST FORM OF SULPHATE OF ALUMINA

ACTIVATED ALUMINA
ADSORBENT AND CATALYST

SODIUM ALUMINATE
HIGHEST QUALITY FOR WATER SOFTENING

"NEOSYL" REGD (AMORPHOUS SILICA)
UNIQUE LIGHTNESS & FINENESS

"TYPHOX" AND TITANIUM POTASSIUM OXALATE
IDEAL MORDANTS FOR LEATHER DYEING

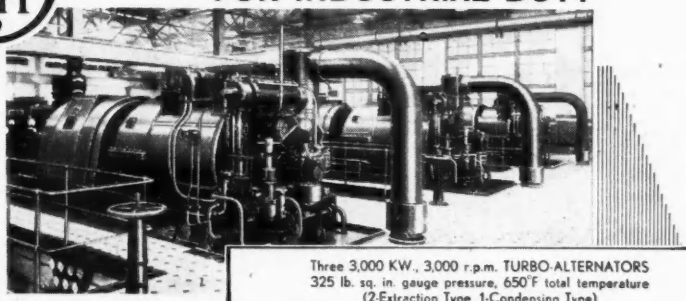
TITANOUS SULPHATE
A MOST POWERFUL & ECONOMICAL STRIPPING AGENT

PETER SPENCE & SONS LTD
NATIONAL BUILDINGS : MANCHESTER 3
LONDON OFFICE: 4 HANGER GREEN · EALING · W.5

REGD G.1

B T-H

TURBO-ALTERNATORS
FOR INDUSTRIAL DUTY



We make turbine plant of any type and any capacity

Three 3,000 KW., 3,000 r.p.m. TURBO-ALTERNATORS
325 lb. sq. in. gauge pressure, 650°F total temperature
(2-Extraction Type, 1-Condensing Type).

Each of the two extraction type turbines (illustrated in foreground) supplies 70,000 lb. of steam per hour at 25 lb. gauge pressure for factory process work.

Three BTH 4,000 KW. Turbine Sets are also installed in this power-house.

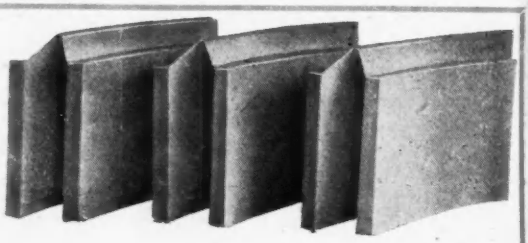
BTH

THE BRITISH THOMSON-HOUSTON CO., LTD.
CROWN HOUSE, ALDWYCH, LONDON, W.C.2.

A 3231

AEI

For Maximum Resistance-



"NORI"
ACID RESISTING
WARE

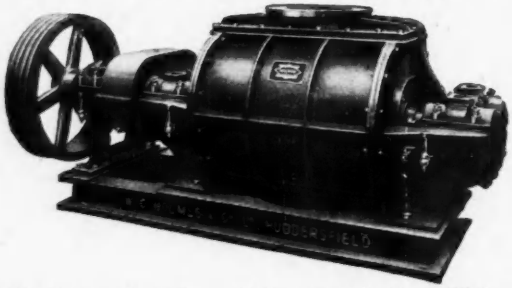
Exceptionally prolonged service is assured when Tanks, Towers, Scrubbers, etc. are lined with Accrington "Nori" Ware.

Impervious to acids and most other chemicals.

Data and Estimates on request.

ACCRINGTON BRICK & TILE CO.
ACCRINGTON
Phone - - Accrington 2684

HOLMES-CONNERSVILLE
POSITIVE AIR BLOWERS



● *One of the many Holmes-Connersville Blowers supplied to Chemical Works. Capacity of machine illustrated, 120,000 cu. ft. per hour against a pressure of 3 lbs. per sq. inch. Speed 400 r.p.m.*

deliver a positive, reliable and oil-free supply of Air economically and efficiently.

Absence of internal contact ensures long life, low maintenance and continuous operation over long periods.

Many of these machines are in successful operation for the handling of Gases.

HOLMES
HUDDERSFIELD

HEAD OFFICE: TURNBRIDGE · HUDDERSFIELD
LONDON OFFICE: 119 VICTORIA ST. · S.W.1

Also at 21, BENNETT'S HILL, BIRMINGHAM, 2
Telephone: Midland 6830. Telegrams: "Biprodeng," Birmingham

C 183

Printed in Great Britain by THE PRESS AT COOMBELANDS, LTD., London and Addlestone, and published by BENN BROTHERS, LTD., at Bouverie House, 154, Fleet Street, E.C.4., November 28th, 1942. Entered as Second Class Matter at the New York, U.S.A., Post Office.